Read Report Allentown, Pennsylvania, Convention, Page 20, This Issue.

AMERICAN ARTISAN and Hardware Record

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Thoroughly Covers the Hardware, Stove, Sheet Metal, and Warm Air Heating and Ventilating Interests

AMERICAN ARTISAN and Hardware Record

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OHIO STEPS OFF IN FRONT.

The Ohio Sheet Metal Contractors' Association has taken a step which we believe will be of extreme importance in the further development of this organization of progressive business men.

As announced in the proceedings of the Ninth Annual Convention, published in our July 21st issue, the Board of Directors have appointed a professional secretary, selecting for that office a man who, according to those who have come to know him through personal contact with him in similar work, has all the qualifications that go to make a secretary a paying investment.

With all due respect to the unselfish and often unappreciated work which in the past history of sheet metal associations has been done by men of the craft who have served as secretaries, one of the chief reasons for the slowness with which state and local associations of sheet metal contractors have been developing, lies in the fact that a man who is in business cannot afford to give the time required for association work if that work is to be of anything but the merest routine character.

The arrangement under which the employment of Mr. Mooney as Secretary of the Ohio Sheet Metal Contractors' Association has become possible is, so far as we can judge at this time, a very fortunate one, and we shall watch with interest the result of this new departure, extending to Mr. Mooney all of our facilities for letting the sheet metal contractors of Ohio, who are not now members of the State Association, know what is going on

For when it is remembered that there are in Ohio nearly 3,000 sheet metal contractors, it will readily be realized that only by a material increase—not a ten or twenty per cent, but several hundredfold—in the membership can the State Association hope to gain the influence in legislation which it must have in order that the men of the craft—employers and employees alike—may not be unduly hampered by legislation against their interests and against the real interests of the public.

We know from experience that a steady and considerable growth in membership—after a certain period where personal friendship and acquaintance have been exercised—can only be accomplished by professionals—by men who are conversant with organization work: All great organizations came at some time to the point where it was found necessary to employ men who by reason of their experience had become "experts" in secretarial work, and we believe that this time has come for the sheet metal contractors—not only in Ohio, but all over the country.

Our readers will agree that if there had been in the various states bodies of sheet metal contractors, large enough in number of members, much of the present legislative handicaps under which the trade at this time suffers, would never have been passed.

So, we wish Mr. Mooney and the Ohio Sheet Metal Contractors' Association every possible success in their partnership. Mr. Mooney will have a lot of work to do and, we trust that he will not forget that one of his jobs is to see that the individual members of the association, of which he is now secretary, do not forget that they—personally—must support him.

And further, we sincerely hope that this experiment which is now being started in Ohio will prove so successful that all the other state associations in the near future will be placed on the same footing.

Here is good luck to Ohio and to Mr. Mooney.

Random Notes and Sketches.

By Sidney Arnold

There are times in our careers when we are called upon to halt in our mad rush for business, in order to cheer a fellow member who has met with misfortune. Such a time came to me the other day when I learned through J. J. Walsh, Sales Manager of Haynes-Langenberg Manufacturing Company, St. Louis, that our well known and highly esteemed friend, E. B. Langenberg, was taken to the hospital where he underwent an operation for acute appendicitis. The operation was successful and Mr. Langenberg it is expected will be back at his old haunts in the near future.

* * *

While walking down the street towards the river in Detroit the other day I met Joe Stearns, of the Stearns Register Company, all smiles and dimples, with a mischievous look in his eye.

Upon reaching me, he grasped my hand and gave me a regular good old college hand shake and exclaimed: "Well, 'Sid,' I've sure got it now, prohibition or no."

"Got what?" said I, trying to fathom his meaning.

"Why, a new recipe for home brew. Take out your note book and write it down.

"You chase a frog for ten miles and gather up the hops. To this you add half a pint of shellac, ten gallons of water, four pounds of tanbark and four gallons of homemade soft soap. Strain through the heel of an I. W. W. sock to keep it from working. To each pint add a grasshopper to give it a kick, but don't serve to your friends."

* * *

During the National Hardware Congress at Richmond, Virginia, many of the Northern visitors stopped to look at the two big live alligators that are kept in the lobby of the Jefferson Hotel.

This is the conversation overheard by Vice-president George M. Gray, of the National Retail Hardware Association. It took place between an elderly woman and one of the hotel employes:

"You say you don't have to feed him very often. What kind of food does he like best?"

"Babies, ma'am," replied the man mildly.

"Why, mercy me, how horrible! I shouldn't think the law would allow you to feed him such things."

"It doesn't, ma'am," asserted the attendant. "We feed him fish mostly, but you asked what he liked best."

* * *

Herb Symonds, who was president of the Missouri Sheet Metal Contractors' Association during the past year, knows how to run meetings smoothly and one of the reasons is that he knows how to shut off discussions that look as if they may get overheated.

That is why nothing ever happened during Mr. Symond's term like the following:

The town council was having its monthly meeting and Mr. Hicks, the belligerent and radical member, had been indulging in a one-sided but heated argument with the dignified presiding officer. Finally the latter found a long enough opening in the monologue to say loftily:

"The chair will not dispute the point with Mr. Hicks, unless—"

"The chair had better not," interposed Mr. Hicks, with disheartening energy, "unless it takes its coat off."

* * *

Hamp Williams, than whom, etc. (you can think anything nice about him and it fits) tells the following to show that he is taking his responsibilities as President of the National Retail Hardware Association seriously:

Mr. Bongs, bumptious and self-important by nature, had become all the more so since his election to the state legislature. Arriving at a certain public gathering late when the space around the speakers' stand was well filled, and wishing to show himself off to the best advantage, he lost no time in shoving his way unceremoniously through the crowd, only to bring up against the broad back of a husky but common citizen escorting the lady of his choice.

"Move aside there," he commanded peremptorily, tapping the other on the shoulder.

"Gwan, an' who are you with your move aside there?" demanded the citizen.

"Don't you know who I am, sir? I am a representative of the people!"

"Well, wot of it?" asked the other, settling himself comfortably. "You know wot we are? We ain't nothin' second-hand. We're the people themselves."

* * *

Any one who has ever been active in organization work will appreciate the following bit of poetry, and maybe some of the "kickers" may take a hint and change their ways after reading it:

The Clique.

What is "The Clique?" 'Tis a body of men
Who attend every meeting, not just now and then;
Who don't miss a meeting unless they are sick—
These are the men that the grouch calls "The Clique."

Who don't make a farce of that sacred word, "brother,"
Who believe in the motto to "help one another";
Who never resort to a dishonest trick—
These are the men that some call "The Clique."

The men who are seldom behind in their dues,
And who from the meetings do not carry news;
Who attend to their duties and visit the sick—
These are the men that the crank calls "The Clique."

We all should be proud of members like these—
They can call them "The Clique" or whatever they please;
They never attempt any duties to dodge;
These are "The Cliques" that run 'most every lodge.

But there are some people who always find fault,
And most of this kind are not worth their salt;
They like to start trouble, but seldom will stick—
They like to put all of the work on "The Clique."

Phegley Shows Sheet Metal Men How the Construction of the Building Affects Directly the Heating Economy.

Quotes Remarks of James D. Hoffman in Regard to Soft Coal Consumption in Average Residence to Substantiate His Observations.

IN the following address on Heating Economy as Affected by Building Construction, Frank G. Phegley, Engineer, Hart & Crouse Company, Utica, New York, and Pittsburgh, Pennsylvania, has outlined some of the difficulties with which the warm air furnace installer comes in contact and how these difficulties can be alleviated.

Heating Economy as Affected by Building Construction.

Exhaustive observations have shown the annual soft coal consumption in the heating of the average residence is about one ton more than the total number of rooms, and principal halls, in the house. With a type of construction that is not only possible, but which should be expected, this amount of coal can be reduced to three quarters of a ton for each room and principal hall. This statement is not made from any information obtained by a personal investigation, but is quoted from the remarks of James D. Hoffman, Professor of Practical Mechanics of Purdue University, La Fayette, Indiana, which are based on the results of actual operations.

Professor Hoffman gives an illustration of possible savings, by calling attention to the average fuel consumption in heating a cottage of six rooms, bath and hall, which ordinarily is about nine tons of good soft coal for the heating season. With proper construction the consumption would be about six tons, or an actual saving of 33⅓ per cent. This saving in view of high coal costs, and at many times the impossibility to obtain coal at any cost, would seem to warrant some action on the part of Heating Societies to exert some means of publicity to bring this all important subject to the attention of the house owner.

In addition to the general good of the community, it would also result in better satisfied customers, and consequently better satisfied contractors as often the contaractor is quite severely criticized for the fact one particular installation is so costly in fuel consumption, when another installation in the same neighborhood, installed by another contractor, is so economical, while the two buildings from every casual observation are similar in size, design and construction. The contractor, who apparently failed in his work, may have executed a far better installation, but due to faulty building construction, over which he had no control, he must suffer the continual abuse of the owner.

Eliminating Faulty Installation.

In the specifications covering steam and water heating, where the contractor is called upon to execute his own design, and consequently must assume room temperature guarantee, there is generally a clause calling attention to the fact that the contractor must not use as a defense, in the failure of his guarantee, the building construction, unless notification to that effect is given before proceeding with the work. This has eliminated a great many faults in building construction where boilers are to be installed, but faulty construction still exists in buildings designed for furnace heat. Should a similar clause be inserted in a furnace specification it would encourage the Furnace Contractor to look over the premises before he submitted his bid, or at least before starting operations, and as a result the major portion of his future troubles would be eliminated. Under present conditions little thought is given to possible complications.

In the development of the warm air furnace we have come to the point where we demand a 60 per cent efficiency, that is 60 per cent of the total heat generated must find its way into the heating system, the balance, or 40 per cent, is lost through imperfect combustion, by radiation, and by convection up the chimney. The contractor can do no more than look to the several manufacturers to investigate the problem of furnace efficiency, but the contractor is greatly concerned with the 60 per cent actually produced, and as contractors and heating experts can assist materially in the conservation of the heat and reduction of fuel costs, by a vigorous campaign in the cause of proper building methods.

The contractor interested in steam and water heating takes a great interest in pointing to the inaccurate operation of the warm air system, and lays great stress on the fact that wind conditions make it impossible to properly heat by warm air, while steam or water can heat under any condition. This is true only as far as faulty construction is concerned, as there is absolutely no more B. t. u. loss in a building when heated by gravity warm air system, than in a building heated by gravity steam or hot water, provided the same method of building construction is used in each case.

Furnace System Designed on Same General Basis as Steam or Hot Water.

The furnace engineer designs his system on the same general basis as the steam or water engineer, and the furnace engineer makes necessary compensation for cold side by larger volume of air for same exposure,

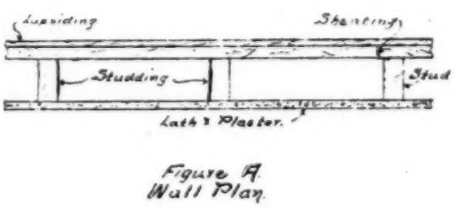


Figure A.
Wall Plan.

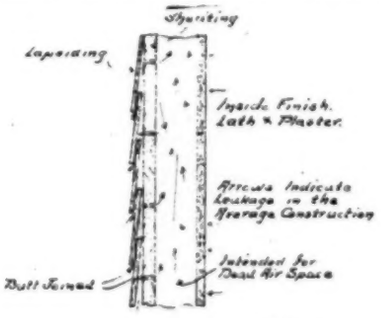


Figure B.
Wall Elevation.

PLATE 1.

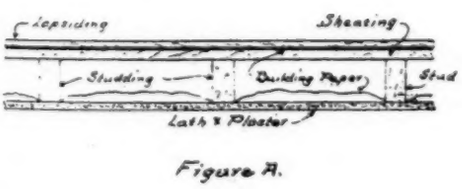


Figure A.

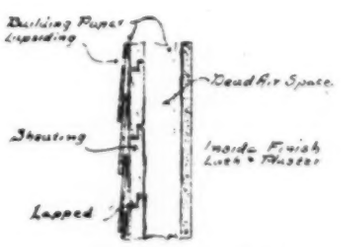


Figure C.

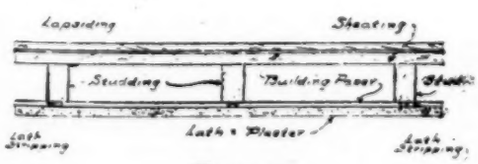


Figure B.
Wall Plans.

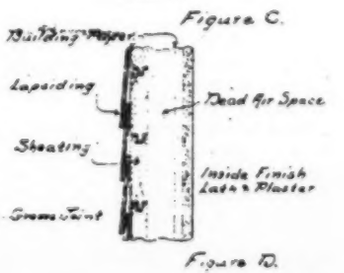


Figure D.
Wall Elevation.

PLATE 2.

while the steam or water engineer provides a greater amount of radiation. The length of run from source of supply to point of use is given the same consideration in all systems; namely, the longer the run, the larger the supply pipe, or in other words, it is the aim to equalize friction in all systems to obtain uniformity of flow. Again, all engineers, whether furnace, steam, or water, give the same consideration for locations of heating medium in the room; that is, the best location for the warm air inlet, or the radiator, as the case may be, considering the exposure to be taken care of.

The underlying principles of heating, regardless of the system, are identical, and it therefore follows that any one of the systems would give the same comparative results if installed under corresponding conditions. Consequently, furnace installation demand would increase materially, provided building construction in the furnace heated house was looked after in the same manner as the building construction of the house which it is anticipated to heat with steam or hot water.

The larger buildings, such as schools, apartments, factories and the like, have shown a marked development in the improvement of construction methods, not because of any degree of more advanced knowledge, but because of the application of the design. The designing architect in most cases will superintend the construction of the larger buildings, but as a rule, the erection of the smaller buildings, in which the furnace contractor is interested, is left to the general contractor, or the owner, who do not appreciate the necessity of a tight building.

To boil the subject down, it can be truthfully said that a decided conservation of the 60 per cent of the total heat generated in the smaller buildings, commonly known as the framed wall, or balloon frame type of construction, can be accomplished, and such a result would be obtained without any improvement in the furnace as it is now constructed, or any improvement made in the design of the warm air furnace system of heating.

Difference in Cost Great in Maintenance.

The framed wall, or balloon design of building, lends itself to many types of construction, at a first cost of little, if any, difference, but with a maintenance cost of an extremely big difference. Not only is the maintenance increase evident in the cost of coal for heating purposes, but also in the wear and tear of the materials used in construction, due to the inclemencies of the weather, and again in the expense of keeping the premises clean, all as made evident by a careful analysis of the following illustrations:

Installation in Building for Quick Sale.

A type of construction generally used in buildings erected for immediate sale, or by owners who are not informed as to what is good or bad practice, is shown in Plate 1, Figures A and B; A being a horizontal section, and B being a vertical section of the surrounding walls. This consists of an outside finish of butt joined sheathing covered with siding and an inside finish of lath and plaster. Both outside and inside finish are applied directly to the ordinary studding placed on 16-inch centers.

The butt joints make an extremely bad construction, as it is impossible to make a close fit, and as a result there is an abnormal amount of air infiltration at times when wind is blowing toward the building, and an outward leakage when wind is in opposite direction. This means an exceedingly large volume of cold air is admitted to what is really intended for a dead air space, under one condition, and the removal of heated air, under the other condition. Furthermore, rain is beaten in between the walls, and as the interior or inner surfaces of these walls are not protected by paint, de-

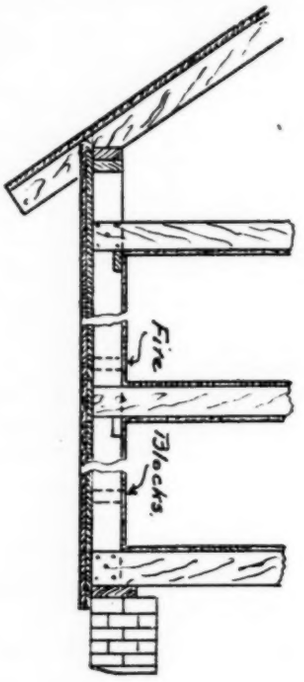


PLATE 3.

cay is hastened. This condition is greatly aggravated when building settles, or after shrinkage, as these joints open up. Such a condition can be avoided by the use of sheathing with a tongue and groove, or a half-lap joint, and to be free from loose knots, as shown by Plate 2. Then, should the settling of the building or shrinkage become a fact, the joints will not leak, as such an operation is not sufficiently great to pull the joints entirely apart. As a further precaution, building paper should always be inserted between the sheathing, and lap siding.

With such a construction, the rooms on the windward side of the house can be heated as readily as all other rooms, whereas under ordinary construction, the rooms could not be comfortable, no matter what system of heating was installed.

The method of attaching lath and plaster directly to the studding, as shown in Plate 1, is extremely bad, and should be avoided by inserting a building paper between, as indicated in Plate 2, Figures A, B, C, and D. Figures A and C show building paper nailed to the face of the studs, with sufficient slack to permit the plaster to clinch on the inside of the laths without tearing the paper. When applying the paper, the upper sheets should be put on first, so as the lower sheets will overlap. The other method shown in Figures B and D is to stretch the paper fairly tight over the studs, and tack laths to the inner surface of the studs, then apply the laths in the usual manner. Either method, however, will result in a decided saving in fuel. Should the latter method be used, it would be necessary to build up the thickness of the window and door casings, on account of the increased thickness of the walls, caused by the thickness of the stripping laths.

To convince the owner of the necessity of such a construction of the outer portion of the wall may not be a hard matter, but it might be somewhat difficult to convince him of the construction of the inner portion. However, when his attention is called to alternating dark and light lines on a side wall or ceiling, and he is informed the light lines indicate the location of the laths, and the dark lines the spaces in between, and that the lesser resistance of the plaster has allowed heated air to pass through, filtering out the dirt and leaving it behind, the problem becomes quite simple, and he not only will consent, but will probably insist upon the better installation.

The Dead Air Space.

The construction of the outer and inner portions of the wall as outlined or as shown in plates mentioned will result in what was originally intended as a dead air space which, as we all know, is an extremely poor conductor.

There naturally will be some transmission of heat from the room to the dead air space due to the difference in temperature of the two sides, but if the infiltration through the outside portion is stopped or nearly stopped, then the difference in temperature is not so great, and the B. T. U. transmission is correspondingly reduced, with a saving in the fuel consumption.

It happens often that the effect of the dead air space is not obtained due to the fact that many buildings are constructed with the stud spaces opening directly into the attic or basement rooms, or perhaps into both, as shown by Plate 3. In the event these points are left open, they act as ventilating flues, and the colder air from the basement will quickly pass up to the attic space, and in this journey the air will absorb a great deal of heat, which escapes through the roof construction to the atmosphere. It is a well-established fact that wind velocities are more detrimental to heating efficiencies than extreme still cold, and for this reason, and to obtain the extreme advantage of the dead air space, it becomes necessary to close or block off the stud spaces, both top and bottom. This is effectually done, as shown in Plate 4, Figures A, B, C, and D. Figure A shows the most simple form of inserting a filler block between the studs at floor line or just

on top of joist, which is often done in old buildings. In case of new buildings it is considered better practice to lay the rough flooring so as it will extend under the stud, and place a plate over this floor, to which the studs are attached. This is the most effectual way of shutting off air circulation, which is shown in Plate 4, Figure B. Additional saving has been accomplished by inserting stud blocks, as shown by dotted lines in Plate 3. This is done by nailing in stud ends, sawed to fit between the studs. Such blocks are sometimes called fire blocks, and are recommended by fire insurance companies, as they reduce the fire hazard, as well as improve the insulating qualities of the wall.

Heat Loss in Framed Wall Construction.

The attic space in a framed wall construction house is a source of a great deal of heat loss, and greater care should be given to a means of insulation. Plate 4, Figures C and D, show two means of accomplishing the desired end.

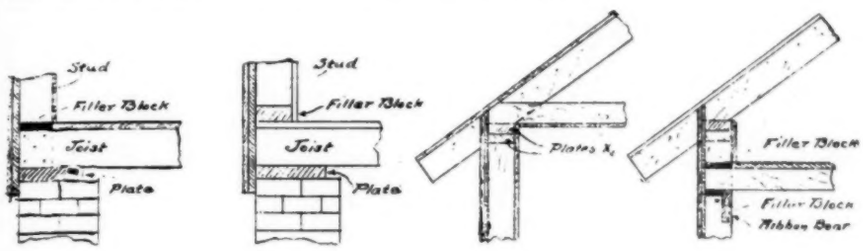


Fig A Fig B Fig C Fig D

PLATE 4

Figure C shows the construction, where attic storage space is not a factor, and where the roof construction is joined directly to the joist and framing. In this case, the upper portion of the rooms below are generally finished up to roof line and includes the plates shown at X. In cases where these plates are omitted it encourages tremendous loss in economy by the passage of heated air to attic space. Figure D illustrates the best construction when it is desired to extend the attic to obtain head room for storage purposes. In most cases, the stud spaces are usually wide open to the attic. These should be closed by stripping the under side of the joists, but a more satisfactory method is to floor the attic and fill in between the studs. As a matter of fact, the entire attic floor should be laid in same manner as the lower floors, which reduces the heat losses through the ceiling below to a minimum.

Window and Door Frame Construction.

A serious problem in all buildings is the window and door frame construction, together with the setting of the sash, but this is more often neglected in this type of building than any other. We often hear the remark that air leakage around windows is not serious, as it serves as a means of ventilation. As far as that is concerned, we need have no fear, as the best window construction known, after being weather-stripped and the casings caulked, still leak sufficient air for good ventilation for more occupants than are likely to occupy the room at any one time. Should a crowded condition exist at times, it is quite easy to open the window a trifle during that period.

A great many experiments have been made to determine the air in leakage around doors and windows, but as yet the results obtained are subject to much guess work, due to the various ways such work is installed. The conclusions of H. G. Whitten, formerly chief engineer of the Chamberlain Metal Weather Strip Company, after a long series of experiments, have been generally accepted as being fairly correct in most cases. Mr. Whitten's deductions are:

"Average wind velocities in localities where heating is important in miles per hour is 13.

"Average sash clearance in inches, one-sixteenth.

"Air pressure equal to fifteen mile wind velocity against a window having a 1/16-in. clearance will force 146 to 185 cubic feet of air through each lineal foot of window clearance per hour."

When we stop to consider that most all of the average windows have a larger sash clearance than 1/16 of an inch, together with the fact that the framing is not tight, we easily realize that it will take considerable coal to raise the temperature of this air inleakage from zero outside to 70 degrees inside. Then the importance of window construction is better appreciated.

As an example of what is actually happening in a great many homes today, let it be assumed a living room 16x14x10, which is a fair size, contains three windows each three feet wide, and six and one-half feet high, which would make a total window perimeter of fifty-seven feet. A crack of 1/16 of an inch, which is below the average, around each window, and with a wind velocity of fifteen miles striking the window, means, with an inleakage of 146 cubic feet of air per lineal foot, a total inleakage per hour of 8,422 cubic feet of air. As the cubic contents of the room is only 2,240 cubic feet, the inleakage causes a complete air change in the room every 16 minutes.

It is not hard to understand why it is necessary to provide some means of insulation around windows in addition to the building construction, and it has been found that the additional cost of weather stripping, and caulking, or the installation of storm windows during the heating season, has resulted in a fuel saving of an amount that would pay an interest on the investment of from 20 to 33⅓ per cent, or, in other words, an amount that would pay back the owner in three to five years.

With a heavy inleakage it is practically impossible to heat the room, regardless of the system employed, but the greatest difficulty is experienced with furnace systems, as the inleakage at times is so great as to over-balance the upward flow of the warm air from the furnace to the rooms, and there is, consequently, a reduction, and often a complete reversal of the warm air currents, resulting in a lowering of the room temperature. The occupant, often not knowing the exact cause of his trouble, will frantically fire his furnace, burning many times the volume of coal actually necessary, during which period he is damning the furnace industry in general, and the poor contractor who installed his system in particular, and if it so happens that the contractor has not been paid in full for his work, it might result in a serious conflict between the owner and the contractor, leaving the contractor in a position where it is advisable to compromise, and at the same time possibly injuring his reputation as an engineer, and as a responsible contractor.

A great deal has been said and written in regard to chimneys, their general design, height, area, etc., and all concerned, from the owner to the contractor are now giving this item more serious consideration, and better results are being obtained. However, there is one angle of the chimney question that has been somewhat overlooked, namely, the location.

Effect of Cold Winds on Draft.

Convection of air or gases (their tendency to rise and mix) is due primarily to heat. Any body of gas, upon being heated, expands and becomes lighter. Since all gases are, comparatively speaking, perfectly fluid, the lighter (warmer) volumes rise and the cooler (heavier) volumes fall, an interchange due to gravity. It can easily be seen, therefore, that a protected chimney that keeps the gases from losing their heat as they pass up the chimney will produce a better draft than one which is not well protected and permits the gases to lose their heat. That is to say, an interior chimney (one running up through the house, inside the outside wall) will give more uniform draft than one built up as a part of the outside wall. The effect of the cold winds upon an exposed chimney is to make an erratic draft. When a fire is started the column of cold air within the chimney must be forced out before the warmer and lighter gases can circulate. Occasionally this causes a smoking furnace or fireplace, until the chimney becomes heated, and even then, the draft may continue to be sluggish as long as the cold wind strikes directly against the chimney wall. When the cold wind is not directly against this side of the house the conditions would not be noticeably bad. Inside chimneys are not subjected to such erratic conditions and are to be recommended for best furnace service. In making this recommendation, the writer is not unmindful of the fact that the out-

side chimney has become firmly established as an architectural feature in the home. There is no desire to change this attitude. The outside chimney lends itself not only to outside, but to inside decorative effect, and should be used only with proper restrictions. First, if a consistent draft is demanded for all weather conditions, the chimney should be double walled on the outside or at least as far up as the eaves; secondly, if the heating furnace is to be attached to this chimney flue, it should be done with a full knowledge that the draft may be bad just on those days when the best draft is desired. It should also be remembered that heat radiated by an inside chimney goes to heat the house but that from an outside chimney is a total loss.

The workmanship on a building is a factor equal in importance to the type of construction. Having executed a first-class design, and furnished high-grade materials, the owner has a right to expect the best workmanship. A careless workman may build a substantially strong structure, but the tightness of the wall and the elimination of cracks give him little concern. These defects cause unnecessary heat losses which, in extreme cases, may become as great as three times the loss expected from a well-constructed wall.

Heat loss calculations, like all other engineering problems, are somewhat greater than actual losses, but this factor of safety protects the owner against unforeseen imperfections in construction that are impossible to avoid, but at the same time abnormal imperfections, and those that can, and should be avoided, often make it impossible to properly compensate for heat losses with the use of heat loss co-efficients now in general use, which makes it imperative, as previously stated, that some means of propaganda should be employed covering building construction for the general protection of the furnace industry.

To again refer to what Professor Hoffman has deduced as to fuel loss obtained by his investigations in the state of Indiana, we find that he states:

"Residences throughout the country embody many structural imperfections, that should, and could, be eliminated. The one type of residence which houses the vast majority of the people is the framed wall type. This type is open to the greatest variety of interpretations as to what is good or what is bad construction. In an endeavor to create improved standards of construction, and thus protect the average householder from unnecessary expenditures, as well as to assist in the conservation of a considerable portion of the $54,000,000 coal pile consumed annually in the state of Indiana as domestic fuel, all residents of the state should interest themselves in a movement toward the betterment of these conditions. Attention should be especially directed toward an improvement in the insulating qualities of the outer walls on all frame buildings, toward the better protection of the windows against excessive inleakage, toward the flooring of all attic spaces, toward the sheathing of all studded walls located between any room, and attic spaces, and toward the proper location and construction of the chimney flues."

In conclusion, we can all agree that such recommendations as made for the state of Indiana hold equally as important for the state of Pennsylvania, or any other location, where the heating system is a predominating factor, and if we initiate such a movement it is bound to bear fruit. Then, and not until then, can the heating contractors accept work with a guarantee clause reading, "The contractor shall guarantee to heat the building to 70 degrees F. in zero weather, with an outside wind velocity not to exceed 15 miles per hour." Under such a guarantee a marked improvement, under better conditions, will be enjoyed by the entire furnace industry, including the contractor, the specialty concerns, and those interested in the furnace manufacture.

Turton Analyzes Solutions Presented to His Problem of Pipeless Furnace Installation.

Chief Stumbling Block Is the Matter of Providing Higher Temperature in Bath Room.

IN the analysis of the solution to my pipeless problem by Mr. McGowan we have already gone quite into detail on several factors, hence we shall not repeat more than necessary in covering the other solutions offered. Now that you have the correct solution, comparison will save considerable explanation.

Note the location Charles Wilson offers. The living room is 13 by 14 feet. Suppose the good lady had a 9 by 12 (the usual) rug. That location would "raise Cain." Never suggest cutting a rug.

The living room would overheat while second floor would receive practically no heat, except from the bathroom. Why? Return air would not function, due to the very indirect path. The 10 by 30 grille would not function. Heavier air on second floor would flow through spindle railing at A and B and form a blanket over stairway which the warm air from this small grille could not lift. Pipe to bath room is correct.

Mr. Harrison says his pipeless experience is covered by work on one job only. After he has experimented with a few hundred, I'm sure he can consciously change a few ideas expressed in his article of March 10th.

His solution of the problem is better than hundreds of installations I've seen. He has used good judgment in locating grating two-thirds in the living room, making allowance for the difference in temperature required on the second floor. In this respect he is nearer correct than Mr. Menk's solution, in your March 24th issue, which is centered under the partition. Otherwise, so far as the explanations go, these two solutions are identical and both will produce quite satisfactory results in all but the bath, which both ignored.

Hence the problem is not solved, for the bath requires 85 degrees and the bed rooms but 65.

This location will heat the second floor in spite of open stairway and spindle railing. The continuous flow of heat direct from heater into the small stairway will force its way up along the wall and the cooler air will descend at the spindle side, aided by the direct "pull" of heater at the bottom. However, this installation does not represent fuel economy. Sleeping with open windows is desirable, hence no heat in the rooms necessary during that time or during ventilating hours. Conserve fuel and you make a hit with the purchaser.

Mr. Byor's installation would undoubtedly produce required results in all except the bath. 65 degree air from the hall could not be coaxed up to 85 by straining through a grille. But I fear if Mr. Byor suggested all those grilles and registers it would bring forth a tirade of rolling-pin phraseology which would be difficulty to diagram. However, he need not feel the least abashed. He has tried and will find the next effort more productive.

Mr. Sedgwick, in your May 26th issue, gets correct location and method of heating second floor. But the adjustable metal ceiling register

make a much better job and the shut off valve will not only permit temperature regulation, but save fuel as well.

In spite of this, we could safely give Mr. Sedgwick full credit, if he had not turned such a chilly breath toward the bath room. And perhaps he is wondering how he can use the cone suggested, for his type of heater. Don't do it. Alter the shape to fit in warm air space between casing and heater and results will be the same.

Mr. Barry offers what has been termed a three way system—very flexible method. But I'm wondering why he makes location wholly in the living room. It will not produce uniform distribution on the main floor. The 22-inch drop over cased opening will direct the heat travel toward opposite side of living room and continuous flow will keep it going that way and hinder flow to dining room until living room is overfilled. This is a very common error in pipeless location.

I see no reason why this heater could not be located in the cased opening with one return air grating in stairway as Mr. Barry has it.

Without doubt the pipe connection will heat the bath room. But bear in mind the average person knows very little about operating a furnace, and the less dampers for him to manipulate the better the heater will function. Shun any attachment that closes even part of the warm air outlet and can be misunderstood or forgotten. Result is an over-heated furnace with all its dangers and ill effects.

I am very grateful to all who lent assistance with their opinions and solutions. I know that others have followed them closely and will profit therefrom, although the problem was very ordinary compared with hundreds that have been solved with the simple pipeless.

AMERICAN ARTISAN is to be commended for the liberal space devoted and earnest desire to present proven practice to all readers. Let the good work continue.

"Trow" Warner and "Bill" Laffin, Tuttle & Bailey, Promoted.

It is always good to learn of the advancement of our friends and the promotions given Trowbridge Warner and William P. Laffin by the Tuttle & Bailey Manufacturing

T. E. Warner.

Company come as pleasant news to the trade. On July 10th with the advancement of W. T. Reynolds to the management of the New Contract Department of the Tuttle & Bailey Manufacturing Company,

W. P. Laffin.

"Trow" Warner was appointed General Sales Manager of the Company and "Bill" Laffin, Manager of the Chicago house.

While congratulations are due Mr. Warner and Mr. Laffin, who both although still young men, have made enviable records in the register game, we cannot help but feel that the Tuttle & Bailey Manufacturing Company are to be congratulated upon their recognition of real merit.

Haynes-Langenburg Manufacturing Company Issues New Price List.

A new price list and discount sheet dated July 16, 1923, has appeared from the Haynes-Langenberg Manufacturing Company, St. Louis, Missouri.

Water Filters Are Needed in Mexican Cities.

A good opportunity exists for the development of the market for the ordinary house type water filter in all parts of Mexico, owing to unsatisfactory conditions, says a report to the Department of Commerce from the Trade Commissioner's office in Mexico City. In all the large cities most every foreign family filters its own water in the above-mentioned filters. Few of the lower classes of Mexicans have as yet been educated to use this filter, but the same is coming into wider use gradually.

The ordinary faucet filter used in the United States is practically unknown in Mexico, very few of them being used. Thus sales of faucet filters averages about one per month, this being the probable average for all dealers in Mexico.

Outside of Mexico City, in most of the coastal cities and towns, the use of the filter seems to be limited to the best hotels, no private families using the same. In these coastal towns, the need for filtering the water is much more necessary because of the great unsanitary conditions prevailing in many of them and excellent markets could be developed here with the proper advertising work.

Practically the only house filters on the market in Mexico City are of German or Austrian manufacture.

Pattern for Making Drums Used in Chemical and Gas Manufacturing Plants, with Necessary Joining Tees.

Working Drawing Shows How One Tee Intersects Body of Drum, While Another Intersects Spherical Head.

Written Especially for AMERICAN ARTISAN AND HARDWARE RECORD by O. W. Kothe, Principal, St. Louis Technical Institute, St. Louis, Missouri.

IN chemical plants and gas plants, drums are used for various purposes and tees require joining to these drums. In this case we have one tee intersecting the body of the drum, while another tee intersects a spherical head of the drum. The spherical heads are in this case exaggerated to make the intersect-

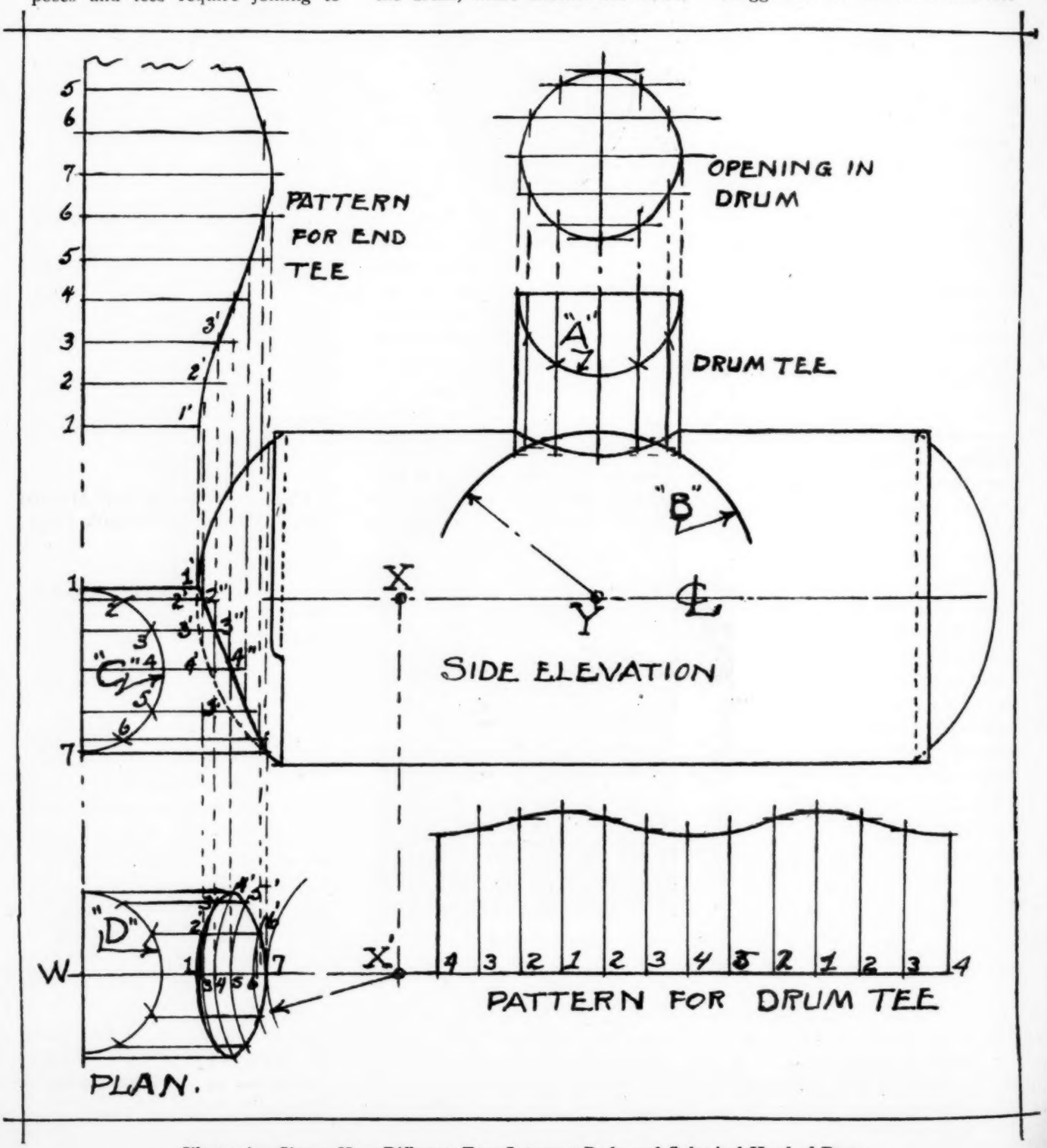


Illustration Shows How Different Tees Intersect Body and Spherical Head of Drum.

ing lines more pronounced and show off the drawing better.

We first draw the side elevation, drawing a section through the body of drum with center Y and from the center erect a center line for the drum tee. Describe section "A," divide it in equal parts and drop lines until they intersect with the arc "B." Then draw a straight line, as 4-4 in the pattern for drum, and on this line set off the girth equal to twice the length of section "A."

Erect stretchout lines and then with dividers pick those elevation lines and set off on these in stretchout of similar number. This enables tracing the miter cut through the intersection. Should the pattern for the opening in the drum be required, pick the girth from the spaces the elevation lines produce in arc "B" and set them off above on a straight line.

Observe for a straight tee of this kind a side elevation miter line is not exactly needed, and if the workman desired it, he can easily lay it over the end view by projecting lines back and forth, which enables tracing that miter line. When the stretchout lines for the opening are drawn, then from each point in section "A," erect lines until they meet with lines of similar number. This enables drawing the opening in the drum.

But to lay out the tee, which fits on a spherical head, it requires a little different treatment. Draw the tee in the head, where you wish it and describe the section "C" to suit the diameter the branch must be. Divide this section in any number of equal parts and extend lines past the outline of spherical head. Where these lines cross the arc 1′-2′-3′-4′, etc., drop lines to a center line W-X′. Now as the elevation of the spherical head is described from X, so we drop a line as X′. Then from each point as 1-2-3-4-5 on this line W-X′, we describe arcs both ways. Observe these arcs show the other curvature from the elevation and gives us the width, while the tee in the elevation gives us the depth. So describe half section "D" of similar diameter and number of spaces as "C." From each of these points draw lines to intersect arcs of similar number as in points 1′-2′-3′-4′, etc. Sketch a curve through these points and you have that view of the opening when looking into the top of the drum. From each of these new points 2′-3′-4′-5′-6′ erect lines into elevation again and cross similar numbered lines as in points 2″-3″-4″, etc. This enables tracing the elevation miter line and shows the points of penetration between the tee and the spherical head. The pattern for tee can then be projected by setting off the girth above and drawing stretchout lines and then erecting lines from each point in miter line as 1′-2″-3″-4″, etc. Where these lines intersect as 1″-2″-3″, etc., in pattern, draw a line and you have the pattern for the tee. Edges for flanging must be allowed extra.

Ike Lammers Lays in Supply of Chicken at Grand Rapids Sheet Metal Outing, Bostwick Lake.

The Fifth Annual Picnic of the Grand Rapids Sheet Metal and Heating Engineers was held at Bostwick Lake Saturday, July 21. About eighty-five attended this affair, including the wives and children of nearly every member.

The first event on the program was the usual chicken dinner served family style, which gave Ike Lammers sufficient opportunity of providing himself with enough chicken to last his family over Sunday.

Music during the meal was furnished by Mrs. F. E. Ederle, and the community singing was led by Sam Hazenberg, of the W. C. Hopson Company.

Following the meal, came the ladies drawing contest, in which every lady received a goodly supply of groceries.

Then came the ball game between the Eave Trough Hangers and the Furnace Setters, the former captained by Ike Lammers, and the latter by Don Lamoreaux, with Victor U. Heather acting as umpire. After several hours of combat, the game was called by the umpire and by the use of an adding machine it was discovered that the furnace setters had won by the score of 31 to 28.

The ladies' ball throwing contest was easily won by Mrs. Don Lamoreaux, her last throw being several hundred feet.

The men's tug of war in boats was won by Henry Barkema. This event was surely a test of endurance, as the judges required the contestants to row for about a half hour.

The ladies' rowing contest was called off, owing to the roughness of the lake and in its place they were allowed three chances to throw a ball into a tub of water. This looked easy, but few could even hit the tub. The event was finally won by Miss Struble.

The men's diving contest was won by Ike Lammers, not because of his ability as a diver, but because of the effort he made in doing it.

Committees for the day were as follows:

Sports — Clarence Wormnest: Equipment—George Vander Molen. Judges — Ed Dyksterhouse and Frank Ederle.

Out-of-town guests were Mr. and Mrs. C. H. Ederle, of Battle Creek, and Wayne H. Young and wife, of Des Moines, Iowa.

Especial credit is due Harry Rhodes for the efficient manner in which he planned and handled this event.

Who Makes Randolph Roofing Tin?

Kindly inform us who manufactures or jobs Randolph Roofing Tin.

SPICKEMAN & BRATLEY.
————, Wisconsin.

There are three distinct classes of men: Those who know and proclaim it; those who don't know and admit it; those who don't know and pretend they do. Experience is the only thing that will teach us which is which, but even then we cannot tell if we measure men with the yardstick of personal opinion.

Pennsylvania Sheet Metal Contractors Discuss Association Problems at Annual Convention in Allentown July 26-27.

Inspirational Addresses on Sheet Copper Roofing, Trade Development, Compensation Insurance, and Effect of Construction on Warm Air Heating Were Taken Up.

ASSEMBLING at Allentown, Pennsylvania, July 26 and 27, the members of the Sheet Metal Contractors' Association of Pennsylvania came to the tri-city convention with a determination to give their fellow members the best they had in order that they might promote the common cause and bind themselves into a more closely knit organization. "In unity there is strength" is just as true today as it was on that famous historical occasion when it was first uttered and these men have come to a full appreciation of the significance of unity and coöperation in business.

Thursday, July 26.

The convention was called to order at 10 a. m. and the first session was opened by the singing of "America."

The address of welcome which followed was delivered by Malcom S. Gross, Mayor of Allentown, and a hearty response came from President Louis Luckhard, of Pittsburgh.

The appointment of Credentials, Resolutions and Auditing Committees then took place and the committees were instructed to report later.

Following these preliminaries, Treasurer G. C. Krack made the Treasurer's report, which was well received and finally turned over to the Auditing Committee.

Secretary W. F. Angermeyer then made his report, which is as follows:

Secretary W. F. Angermyer's Report.

The Sheet Metal Contractors' Association of Pennsylvania was organized at Harrisburg January 7, 1920, and is, therefore, three and one-half years old, and today we are holding our fifth convention.

While the growth of the Association has been only normal, we have made good progress, both as to membership and accomplishments, and with closer acquaintance and closer coöperation with each other and the Distributors' and Salemen's Auxiliary, we can feel confident for the future.

The Distributors' and Salesmen's Auxiliary, which was organized at Reading in January, 1922, has proved itself worthy of that name and in behalf of the Association, I wish to take this opportunity to thank its officers and members for their splendid work in eastern Pennsylvania. Pottsville, Bethlehem and Allentown locals were organized entirely through their efforts.

Points to Necessity for Increasing Membership.

As you will note in the membership report, we now have twelve locals in the state, with a membership of over 200, an increase of three within a year. I regret to state that most of the old locals have shown a loss in membership during the past year. There must be a reason for this and I trust this convention will provide ways and means to change this condition.

At the national convention at St. Louis we found that most state association members were paying anywhere from $6.00 to $12.00 dues into the state, and as our members are only paying $2.00, with our present membership we have barely enough funds to meet current expenses and nothing for organization work.

Conditions, as Secretary Augermeyer Found Them, in Western Pennsylvania.

To increase my acquaintance among the sheet metal contractors in western Pennsylvania, I have traveled by automobile and train about 8,000 miles during the past year, and to care for the expense am selling two lines of furnaces and some furnace supplies.

On a recent trip to one of our western Pennsylvania towns, I found they were doing tin roofing as low as $9.00 a square; in fact, everyone in the town seemed prosperous, except the sheet metal men. Sometime in August we expect to have a joint meeting of these men, with some of our members in a neighboring town, and expect to secure their applications. In one of our mountain cities, conditions are just as bad. The sheet metal men are hardly on speaking terms, and it will take time and money to change this feeling. I have no doubt but what there are hundreds of towns in which similar conditions exist and for the good of all, this convention should do something to enable us to reach them. They will not answer letters. We have tried them. The only way to drive the benefits of association membership home, is to meet and talk to them personally. If we can make them understand that they have a business expense that must be added to the cost of every job, it will make it easier for all of us to get a fair price for our work and reduce the jobbers' losses through bad accounts to a minimum.

Following the roll call of officers and members, the minutes of the previous meeting were read and approved, applications for membership were received and the collection of dues was made.

The meeting was then adjourned until the afternoon.

Thursday, 2. p. m., July 26.

The afternoon session was opened with an address on the "Story of Copper" by E. W. Rouse, Jr., General Superintendent of the Baltimore Smelting and Refining Company. This address proved very interesting, indeed, although it was in the form of an informal talk.

The next address to come up was that on "Sheet Copper for Roofing and How to Lay It" by John F. Gowen, of the Copper & Brass Research Bureau. This address contained a great deal of valuable information and it is printed in its entirety on other pages of this issue.

The "Effect of Construction on Warm Air Heating," by Frank G. Phegley, Engineer, Hart & Crouse

THE address of Frank G. Phegley, Engineer, Hart & Crouse Company, Utica, New York, on the "Effect of Construction on Warm Air Heating;" the paper on "Sheet Copper for Roofing and How to Lay It," by John F. Gowen, of the Copper and Brass Research Association, New York; "Advertising for the Sheet Metal Contractor," by W. G. Schrack, Camden, New Jersey, are all included in this issue under separate heads. Two specimens of the blotters used by Mr. Schrack are reproduced with his article. The article by Frank G. Phegley is also illustrated so as to make its explanation more clear.

Company, Utica, New York, and Pittsburgh, Pennsylvania, proved highly instructive. This address is also printed in full in the Heating and Ventilating department of this issue.

W. J. Keist, Chairman of the Vocational Education Committee, made a report on the progress which the committee is making

The final address of the day was on "Trade Development" and was made by Paul F. Bandstedt, the Committee's National Chairman.

Friday, July 27.

Bright and early the members returned to the assembly hall and to proceed with the convention.

The first activity on the program was the report of the Committee on Compensation Insurance. This report was rendered by Edwin L. Seabrook and it proved very instructive to those attending the convention.

"Overhead Expense" was taken up next by W. H. Tinney, Chairman of that committee, and this report was followed by a general discussion of Sheet Metal and Its Uses.

At this time a report of the Trade Relation and Policy Committee was rendered by H. F. Banthan, Chairman of that committee.

The report of the Legislative Committee was given by Thomas Arnold, Chairman, and this was followed by the reports of the local Associations. These reports indicated that progress was being steadily made.

At 11 a. m. the meeting was turned over to the Distributors' and Salesmen's Auxiliary and this meeting was conducted by Thomas Cook, President of the Auxiliary, and O. C. Brooks, Secretary.

A general discussion of labor conditions and estimating for the contractors followed and this discussion as always proved highly enlightening to all of the members who participated and those who heard it.

Friday, 1:30 p. m., July 27.

The first address on the program for the afternoon session of Friday was that on "Advertising for the Sheet Metal Contractor," by W. G. Schrack, Camden, New Jersey. This address was exceedingly instructive and in order that it could be preserved for future reference, it is printed with illustrations on another page of this issue.

G. C. Krack gave a lecture on Advertising in which he used the stereopticon slides. This lecture was very interesting.

R. H. Spare gave an address on Accounting System for the Sheet Metal Business which was highly instructive.

The Committee on Resolutions then made its report.

Following this, the State Association business unfinished and new was taken up.

In Advertising, Anything That Does Not Grow Old Is New, Says W. G. Schrack.

Tells Pennsylvania Sheet Metal Men that Blotters Have Been Good Advertising Ever Since Printing Developed.

THERE is a saying that no man can become a successful salesman until he is thoroughly sold on the proposition himself. He must believe in it before he can instill confidence in others.

The following instructive address on the power of the blotter as an advertising medium was delivered by W. G. Schrack, 118 North Fourth Street, Camden, New Jersey, at the Tri-City Convention of Sheet Metal Contractors' Association of Pennsylvania, Hotel Allen, Allentown, Pennsylvania, July 26 and 27, 1923. Mr. Schrack is not only sold on the blotter proposition, but he also has figures to prove its efficacy.

Blotter Advertising.

Nothing so wonderful and new about blotters, you'll say. True enough, but in advertising, anything that does not grow old is new. Blotters have been good advertising ever since the art of printing developed to the extent of producing good illustrations from plates on blotter stock.

There isn't a pen on earth that feels really at home anywhere unless there's some kind of a blotter in sight. Blotters were created to dry up ink, and they still fill that office, because nothing else can fill it. The blotter is more than useful—it is necessary on every desk.

"Faithful" is another word that fits in here regarding blotters in advertising. Advertising letters are filed away, folders are read (if they are interesting enough) and then lost in the shuffle that is constantly hurrying toward the waste basket. Salesmen are kicked out. But the BLOTTER GETS IN AND REMAINS right there on the desk with its little reminder of your services. It is a noteworthy fact that blotters are always welcome. A clean, new blotter is welcome anywhere. This is your chance to repeat your message to the same prospect without seeming to pester him. In short, a blotter gets in, stays in as long as it is a good one, and a substitute can do the same thing when its predecessor is worn out. From the president down to the scrubbiest clerk in a firm—they all use blotters.

A bunch of blotters placed in the main office will scatter quickly through the departments.

Such expressions as the above certainly ought to prove what I have to say about blotter advertising. After I was asked to give this talk here it occurred to me that I had some connection to this part of Pennsylvania, and after looking it up, I found that the Schrack family originated from this section of Pennsylvania and found that John Jacob Schrack came from Germany in 1717 and settled in Providence township, west of Perkiomen creek, and was naturalized in 1729.

Each Man According to His Needs.

Different localities and different work require different methods of advertising. What might suit you would not suit me and what might suit me would not suit you.

Paper advertising never appealed to me, and as for programs, especially church programs, in my estimation, are for charity and would rather give them a donation and keep it out.

I think the best way to get rid of them is to say I will give you the advertisement, but you will have to take it out in work and then they will not bother you any more.

I had an advertisement in one of the Camden leading papers which I think cost me about $250 and could not trace $2.50 from it, and then started the plan I have now and the first blotters I sent out I got a job of $250.

Have you any idea what some of the leading firms of the country pay for advertisements? Just let me quote you a few. A black and white page in the Ladies Home Journal cost $8,000 and the Saturday Evening Post, $7,000, the American Tobacco Company leads in newspaper advertising, spending $2,500,000 annually. Campbell Soup Company, from my own town, spend $1,300,000, and the Victor Talking Machine Company, which is also from my own town, spend $1,200,000.

I have these blotters for all seasons of the year and never send a piece of mail out but what I have a blotter in it.

My principle reason for these blotters was not to get new customers, but to get my customers to have their work done in the proper time, to get the roof work out of the way of the heater work and the heater work out of the way of the roof work.

I have a mailing list to whom I send every month and I can tell that they are being noticed on account of the different comments I receive from them. Did you ever try this after sending a bill and a number of statements you receive no answer and they seem to ignore your bill? Just add about ten dollars to the account and see how quick they will notice that, and that is what you want in advertising—something that will attract attention. I often see other fellows working on jobs where my blotters have gone, so you see, they have others beside myself.

I cannot do all the work in my city, nor can the other fellow, for he has customers who would not have

me, and I suppose I have some that would not have him. I do not care who gets one of my customers, if he gets him on the level, with no underhand work.

Do not think that you are the only tinsmith in town and that you are the only one who can do the work.

That reminds me of a story I read the other day:

"No matter how the world has raved about you,
No matter how high up in life you've stood.
The world will plug along the same without you,
Somewhere, sometime, there's some guy just as good."

It seems to me that it would be better for us all to pull together and play fair.

Praises the Association.

I was in a city the other day and noticed that on one of the streets all the fur shops were on that street and close together and I should like to see in my town all the tinsmiths in the same block.

The association has been a great help to me and I canot see why the fellows have to be coaxed to join and even after they join you have to coax them to attend the meetings. I know of what I am talking, for I have been secretary for so long that I do not know just how long it has been. Let me close with the following and hope you may have a prosperous year:

"When you meet a fellow Tinsmith,
Walk straight up and say: 'Hello.'
Say 'hello' and 'how d'ye do,
How's the world been using you?'
Slap the fellow on the back,
Bring your hand down with a whack;
Walk straight up and don't go slow,
Shake his hand and say, 'Hello.'

"Is his clothes in rags? Oh, no.
Walk straight up and say, 'Hello.'
Rags are but a cotton roll
Just for wrapping up a soul,
And a soul is worth a true
Hale and hearty, 'How d'ye do?'
Don't wait for the crowd to go,
Walk straight up and say, 'Hello.'

"When big vessels meet, they say,
They salute and sail away,
Just the same as you and me,
Lonely ships upon Life's sea,
Each one sailing his own jog,
For a port beyond the fog.
Let your speaking trumpet blow,
Lift your horn and say, 'Hello.'

"Say 'Hello' and 'How d'ye do?'
Others are as good as you.
When you leave your home of clay,
Wandering in the far away;
When you travel through the strange
Country far beyond the range;
Then the soul you've cheered will know
Who you are and say, 'Hello.'"

$600,000,000 Worth of Metal Consumed Annually by Rust on American Homes Alone.

Gowen Tells Pennsylvania Sheet Metal Contractors that Opportunity for Vigorous Advertising to Arrest This Stupendous Loss Never Was So Great as Now.

IN this address, which was delivered before the members of the Sheet Metal Contractors' Association of Pennsylvania at Allentown, Pennsylvania, July 26 and 27, by John F. Gowen, of the Research Staff of the Copper and Brass Research Association, Mr. Gowen has given an excellent survey of the utility value of non-ferrous metals, particularly copper, when applied to roofing. This paper is highly instructive and embodies much valuable information for the sheet metal contractor.

Some Observations on Copper Roofing, by John F. Gowen.

The opportunity of the sheet metal industry, and of the copper industry as well, grows out of the fact that America has been passing through an era of "something just as good." The result is the enormous waste resulting from buying cheap materials—and then buying them all over again in a short time. You are all probably familiar, for instance, with the results of a study the Copper and Brass Research Association made of the cost of rust in this country—more than $600,000,000 worth of metal is consumed by rust on American homes alone every year. But that is a small part of it all. Roofs that quickly rot, roofs that curl, warp and expire, contribute to make this waste one of huge proportions. The opportunity was never so great for vigorous advertising to arrest this huge waste by creating an enlightened demand for good metal roofing.

At the outset, I would state frankly, that the purpose of the Copper and Brass Research Association is to increase the use of copper and brass. But a homely illustration will show better than mere assertion on my part how this work aids the sheet metal contractor.

The Copper and Brass Association is, as you know, advertising the merits of copper and brass in newspapers and magazines which cover the country. If, let us say, one of these advertisements sells a coper roof—and we have direct knowledge that the advertising is selling lots of them—perhaps a member of this association sells the copper (although that does not necessarily follow, for only about 50 per cent of the copper and brass fabricators and 90 per cent of the producers of copper are members of our organization); but some sheet metal contractor certainly gets the work of applying the copper. And that makes one more job for the metal worker.

Now the logical roof is one of metal. I might say copper, but I will say metal, because there are other good metals besides copper. We think we can convince the public that copper is the best. That is our job.

So I say metal roofs are logical because they are light in weight, and assuredly fireproof. In addition, a copper roof, properly grounded by copper downspouts, is the best possible protection against lightning. Those of you whose homes are in the small town, or out in the farming districts, realize how important it is to have a fire and lightning proof roof. Metal roofs are attractive in appearance, will not crack or chip under a chance stone, or curl or warp in the weather.

Recent Developments in Metal Roofing.

Copper is used as a roofing material in five different ways: Ribbed Seam, Standing Seam and Flat Seam roofing use methods of locking and cleating. The method of application and the appearance of the finished work are similar to other metal roofs

and need no discussion here. Copper roofing is also made in the form of shingles and Spanish tile. These are applied as are other metal shingles, by mechanical locking and nailing. There are also on the market corrugated copper sheets, similar to galvanized iron and zinc.

Recent developments in the art of copper shingle manufacture mark a new era in the industry. The copper shingle has been made beautiful enough to satisfy the most aesthetic taste, while at the same time the labor of laying has been lessened.

There is little more to be said for these "small-piece" roofings. They are most simple in application. About the only care needed, other than to insure straight courses, is at the flashing points, where the use of special flashing strips, made by the manufacturers, is recommended for satisfactory results.

What concerns us far more is sheet roofing. I should like to discuss point by point, what I may term the "essentials of copper roofing."

Essentials of Metal Roofing.

Material.

All copper used for roofing purposes of whatever sort, excepting spouting and cornices, should be "soft" or "hot-rolled"—what is known as "roofing temper."

Copper sheets are made in several degrees of temper, or hardness. Experience has definitely established the two which are best suited for flashings and for gutters and leaders. The building profession has come to know these two as "soft" or "hot-rolled" and "hard" or "cold-rolled" copper and it is comon practice to so designate the sheets in specifying or ordering.

It can be readily understood that because there are different degrees of temper mistakes often occur due to the confusion arising from ordering, for instance, "16-ounce hard rolled copper." The question the manufacturer asks is "how hard?" for the process of manufacture is dependent upon the results desired.

Copper sheets are made from "cakes" which, after being heated to the required temperature, are passed through rolls until the desired thickness of sheet is obtained. The first part of the process is the same for all tempers. When the copper has cooled below a workable temper it is again heated and rolled, this procedure being carried on until the sheet is within a few gauge numbers, or thicknesses, of the finished product.

The hardness of the sheets is determined by the reduction in thickness before reheating. So, depending upon the temper, or degree of hardness, desired, the sheets are brought to certain thicknesses which will give the required final thickness with the necessary rollings, are then heated to the proper temperature, and are finally rolled to the desired thickness—and hardness—and allowed to cool.

From the above process it is obvious that unless the temper, or hardness, is definitely specified, or the purpose for which the sheet is to be used described, the manufacturer has not the information necessary to supply the proper material.

In order to prevent misunderstanding and confusion, and to make as definite as possible the kind of copper desired, it is recommended that the trade adopt the following terms:

Instead of
Soft,
Soft-rolled,
Hot-rolled,
Hard
Hard-rolled,
Cold-rolled,
Use:
Soft (roofing temper), abbreviated (R. T.),
Hard (cornice temper), abbreviated (C. T.).

All flashings of whatever description should be of soft (roofing temper) copper sheets. Such copper is peculiarly suitable for this use, for it is easily worked and shaped and stands up well under temperature stresses. There is no place in flashing, or counter-flashing, where soft (R. T.) sheets will not serve better than hard (C. T.) copper.

For the same reason, or, rather, contrariwise, the material of all shaped gutters, eaves trough, leaders, cornices, etc., should be hard (cornice temper) copper. Its stiffness is necessary to maintain the shape, especially against ice and snow loads. As most shapes are of mill manufacture the process is such that the chance of fracture at the bends is minimized.

In fact, all manufacturers of gutters, leaders, etc., make them of hard (C. T.) copper, because experiment and experience have proved their practicability.

To this general rule there are two exceptions—gutter linings and cornice ornaments. These should be of soft (R. T.) copper.

Gutter linings in gutters of any length are peculiarly subject to temperature stresses. The continual warping to which the sheets are subjected soon fatigues hard (C. T.) sheets and cracks develop at the bends. It is reasonable to believe that the use of a softer metal will overcome this cause of failure.

For ornaments which are stamped from dies, soft (R. T.) copper is superior to hard (C. T.) for it works more easily and is less liable to fracture.

The Decalogue of Copper Roofing

IN this article John F. Gowen, of the Copper and Brass Research Bureau, has set forth in a clear and comprehensive manner, a few of the primary uses and tendencies toward abuse of copper and its application to the roof.

Mr. Gowen takes into consideration in this article the kind and thickness of the copper sheets to be used, the preparation of the surface upon which these copper sheets are to lie; how the sheets are fastened; how the seams are made and tinned; remarks on fluxes, etc., ending his remarks with good, sound advice on avoiding sharp bends in copper sheets.

Laying Surface.

We recommend the use of ship-lap sheathing. Experience has shown that tongue and groove is apt to be driven too tight, therefore, not allowing for expansion and contraction. Boards should be well nailed and spaced, with due regard for the swelling that comes with dampness. It is good practice to sink the nail heads—though straight nailing will obviate this step.

Over the sheathing a good quality roofing paper should be used, resin-sized preferred. Satisfactory results do obtain without this precaution, but, with the present grade of lumber used for sheathing a cushion between copper and wood ought to be provided. It should be properly lapped and nailed with copper nails. The paper should be applied as soon as possible after the sheathing is laid, so as to protect it.

Expansion and Contraction.

Copper sheets must not be nailed. This rule includes as a sheet any piece of copper over eight inches wide. I will touch later on why this is so, but, for the present, too much emphasis cannot be put upon the necessity for observing this rule.

Copper sheets and flashings must be cleated. The cleats should be at least 1½x3 inches and should be nailed with two copper nails. It is an open question as to whether or not the cleat should be turned back over the nail head. I should say it depended upon the kind of a nailing job the mechanic does. The avowed purpose of turning back the cleat is to prevent the nail head from cutting the sheet; if the nails are properly driven home, this labor may be saved. The maximum spacing of cleats should not exceed twelve inches; a spacing of eight inches is recommended.

There are numerous places were nailing is permissible. Eave strips, corner flashings, and other similar strips where the fastening is restricted to one edge require nailing. Here there can be no objection, for the nailing does not constrain the copper from moving freely. All nailing should be done with this in mind—that the sheet or strip must have freedom of movement. Nailing along one edge only permits it to move three ways away from the nailing.

Barbed nails should be used. I have seen otherwise beautiful jobs ruined by the wind because ordinary wire nails pulled out of the sheathing. Especially is this noticeable on buildings where the roof is subjected to heat, as in a factory where hot processes are used. Barbed nails grip the wood and do not pull loose even though the wind lifts the sheets and the interior heat dries out the sheathing.

Needless to say none but copper (or brass) nails can be used with copper. The use of iron nails of any sort means quick destruction of the fastenings, because when iron and copper meet, with dampness to help, an electrolytic action ensues, and the iron is destroyed.

Seams and Joints—Tinning.

It is hardly necessary for me to discuss the technique of the standing or flat locked seam. The same practice is used for all metals, with the possible exception of lead. The

standing seam is generally 1½ inches high; I have seen pretty work done in ¾ inch. The flat seam is always ½ inch.

Lapped seams are generally at least ½ inch and I believe that roofers could get better results by allowing more.

The secret of good seams is found in tinning and soldering. I honestly believe that most of the broken joints I have observed could have been prevented if more thoroughness were used in these two details.

A prominent roofer in Washington told me recently that he had devised a special training trough for use in his shop. It is gas heated and is so constructed—I did not get the details—as to get a thorough coating in one dipping. He is now working on a similar trough for use on roofs. I hope he makes a success of it, for in such a device lies the secret of good roofing work—proper tinning.

Use only pure block tin and don't skimp on tinning. If the specifications call for 1½ inches put on 1¾ inches and save labor on the job. The manufacturers of copper sheets are equipped to do tinning. While I fully realize that it is impossible, on most jobs, to determine in advance where the seams will come, I believe that careful planning will make it possible in many cases, to order the sheets tinned from the mill.

The cost of this tinning seems, at first glance, high. But when one takes into account the labor saved—and no one knows better than you do what labor costs today—it is apparent that the real difference in cost is not great. Tinning, to insure a good tight seam, must be amply and thoroughly done.

Soldering.

There is only one kind of solder, and that is, the best solder, known as "half and half" and composed of equal parts of new tin and new lead. I think you will agree that sentence covers the material end completely.

Method of Approaching.

Now as to method. The weakness of any composite structure, be it a steel frame building or a copper roof, is in the joints. It is imperative that these be made tight and strong. It is easy enough to make them tight at least temporarily. A dot of solder will plug the holes. But when old man mercury gets to work the solder plugs lose hold and drop off and an irate owner makes it his personal business to knock the unfortunate roofer who did the job.

The best results are obtained from wide, well-sweated seams. A prominent roofer in New York flows his solder two inches over his seam. Certainly an inch is too narrow. Lots of solder, well-flowed-over, is the secret of strong seams.

Proper soldering coppers are essential. Sheet copper absorbs heat rapidly. For upright seams pointed soldering coppers should not be used because there is not sufficient heat in the point to heat the sheet and soak the seam with solder. For these a flat chisel-point pattern should be used weighing at least six pounds to the pair. For flat seams use a blunt square and type of copper, weighing not less than ten pounds to the pair. These hold enough heat to insure a good seam. Needless to say the coppers must be hot. The same flux should be used in soldering the seams as was used in tinning the edges. The coppers should be properly tinned before use and, of course, care must be observed in heating to avoid burning the tinning.

Applying the Flux.

Resin is recommended as a flux. Resin is harmless to the metal and, properly applied, insures a good joint. It takes a bit more labor and it means a bit more fussing, but it is a safe method. If you use resin you will have no pitting and no comebacks.

Killed acid is, I know, universally used as a flux. The only trouble with it is that frequently the apprentice gets the job of killing the acid and he doesn't do the job thoroughly. The result—at least on copper—is pitting, and pitting means a damaged reputation for the roofer.

Now I am well aware that there are real objections to the use of resin. It cannot be used, it is said, on windy days, for the winds blow it away; nor on steep slopes, for it will slide off. This is doubtless true, and certainly these difficulties are real. But acid will splatter on windy days and will also run down steep slopes.

If you are going to use acid on copper work, pay especial attention to killing it properly. That is our chief objection to its use. Improperly prepared acid flux and a careless workman can do irreparable damage to the finest copper job.

Avoiding Sharp Bends.

Many roofers—and owners—tell us that they experience considerable trouble with built-in, or box gutters. After a few years, cracks appear in the sheets at the bends, where the sheet turns up to form the sides of the gutter. I know of one large box gutter about 400 feet long (around the building) which has 161 cracks in it. That is to say, there is a break in the gutter every two and one half feet. There are two causes of this; first, hard copper has been used; second, the bands are sharp. Of course, the cause of failure is the use of the hard sheets, but the point to be emphasized is that of these 160 breaks approximately one-half occurred at the bands, where the sheet was held firmly in the angle and so constrained from free movement. It might just as well have been nailed as bent to a sharp 90 degree angle.

To avoid this trouble bend the sheet (of soft copper) in an easy curve over a triangular shaped block set in the corner of the gutter, and see that the carpenter sets them for you. In other words, avoid acute angle bends. Any bend of more than 45 degrees should be made into a gradual or easement curve.

Another point I might mention while on this subject of box gutters is the use of a longitudinal seam down the middle of the gutter. If the gutter is a wide one, this is especially desirable. It can be readily seen that such a construction, as it holds the middle of the gutter securely in place, (it being understood that the fastenings are to be made with cleats,) does away with a lot of buckling and warping, a primary cause of failure in wide box-gutters.

We recommend short sheets in box construction. Where long ones are used the strain on the seams is great This can be relieved by using a narrow strip of copper crosswise with the run of the gutter so as to have two seams instead of one at the critical point.

Do not solder the gutter to the roof. Make the connection with a large loose lock-joint.

Expansion and Contraction.

I now reach a point in copper work that is, I doubt not, foremost in the minds of all of you. You have probably noted that I have made no mention; of it in my preceding remarks.

On this subject there seems to be the greatest differences of opinion. One man advises the use of elaborate expansion joints and another says that he has never used expansion joints and has built some of the longest continuous gutters in the country. Both are experienced copper workers. What is the answer?

There is much discussion in various circles on the use of expansion joints in long gutters. Able users of copper advocate them. We do not. It adds to the cost of the job. There are technical reasons why we do not believe in them which it is not necessary to discuss. My answer to those who say a good job is impossible without expansion joints is this—On the Grand Central Terminal in New York City, there are box gutters, copper lined. These are continuous for 500 feet, and there are no expansion joints. The roof is twelve years old and has never leaked a drop.

I beg your indulgence while I become technical, for the theory of expansion and contraction must be understood to successfully apply the rules of practice.

All materials are subject to variation in size under temperature changes. Water is the best evidence of this. Heated, it becomes steam and in changing from a liquid to a vapor acquires, through expansion, tremendous energy. The mercury in the thermometer is another example.

Copper is subject to the same laws of nature. Its expansion is somewhat greater than that of iron and steel, and less than that of zinc and lead. For this reason the non-ferrous metals require more care in application than do the ferrous ones.

A strip of copper one inch long at 60 degrees, when cooled to zero, contracts in length to 0.99943 inches. If the temperature is increased to 120 degrees the length becomes 1.00057 inches. Now if the strip is assumed as held securely in place the changes in dimension set up an internal stress of 10,400 pounds. The breaking strength of annealed copper is 36,000 pounds a square inch. There is obviously a factor of safety of about 3½. So much for the initial expansion and contraction.

Now as time elapses other conditions obtain. The strip loses its tenacity and becomes brittle. Constantly recurring tensions and compressions create a state of fatigue, and the metal cracks and fails.

As a matter of fact, however, copper sheets are very strained to the degree mentioned. All building materials expand and contract and the expansion of copper is relative to that

of its supporting material. If a copper roof were laid on a steel roof, for instance, the steel too would move under temperature variation and change in dimension. According to the figures the copper would be stressed only 3000 pounds per square inch. The factor of safety is about 10 1-2.

From the above it must be apparent that failures of copper due to temperature stresses alone are extremely rare. When, however, the copper is partially constrained and a joint is provided where the cumulative movement in a sheet of any length can create a buckle or a hinge action, fatigue will eventually destroy the ductility of the metal and fracture will result.

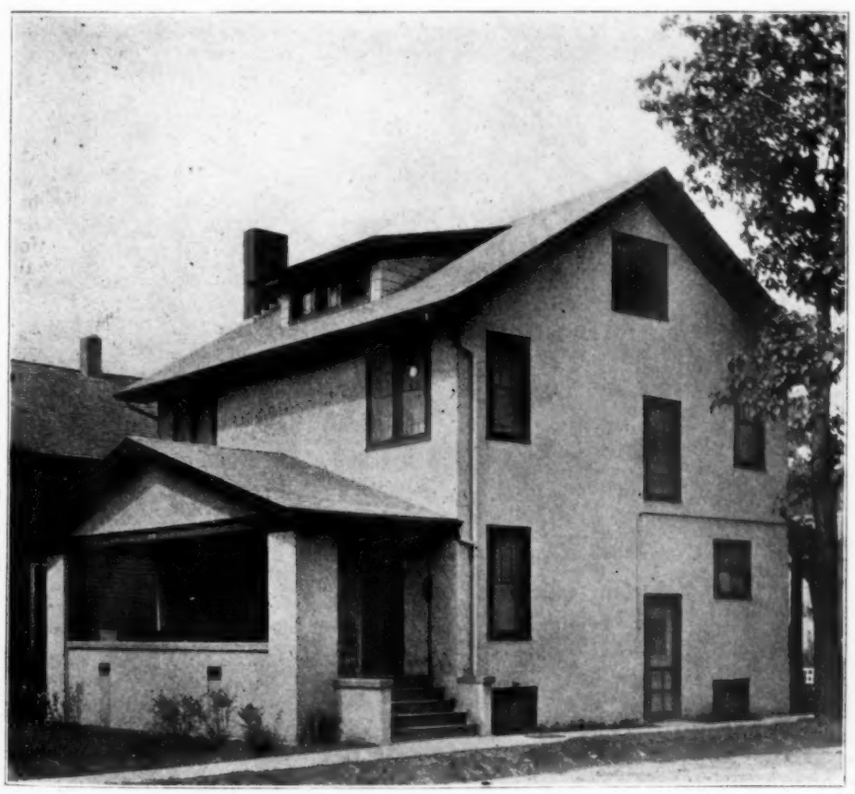
So much for theory. The question naturally arises, "How do I apply the theory to practice?" We all have seen copper jobs crack and tear loose and split, and we all have said, "Expansion and contraction" and shaken our heads wisely and gone our way sorrowing over the one overwhelming defect in an otherwise perfect material.

It has been, as I said at the beginning, part of my work for some time past to investigate these failures. I say unreservedly, gentlemen, that I have yet to see a so-called failure through expansion where I have not found some faulty installation, some failure to observe the simple fundamentals of construction I have outlined. These fundamentals, you will note, cover points where carelessness can do irreparable damage. Proper observance of these points will take care of expansion and contraction.

Kankakee Sheet Metal Contractor Equips Residence With Zinc Roof Which Is Giving Entirely Satisfactory Service.

Flashings, Sides of Dormers and Ridges Also of Zinc— All Sheet Metal Work Done by Henry Reuter & Sons.

EVERY sheet metal contractor takes pride in each job that he finishes. He knows that he has done the best that his superior knowledge, gained by long, continuous experience in the field of his chosen endeavor, has taught him to do. Not only the superior knowledge, but the material he has used in putting the roof in ship-shape controls the outcome of the job. If he uses poor material he can only expect a poor job. It therefore behooves him, for the sake of his reputation and for the sake of his customer, who has placed confidence in him, to use good judgment in the selection of his material.



Residence of Fred W. Sellers, Kankakee, Illinois, Equipped with Illinois Zinc Roofing Shingles and Lexington Warm Air Furnace.

The accompanying illustration is that of the residence of Fred W. Sellers, brother-in-law to Frank T. Reuter, Secretary and Treasurer of Henry Reuter & Sons, Roofing and Sheet Metal Contractors, Kankakee, Illinois.

This house, Mr. Reuter says, is roofed with beautiful blue-gray Illinois zinc shingles. The gutters and down spouts are made of galvanized iron, while all roofing, flashing, sides of dormers, ridges, etc., are made of Illinois zinc.

This job was done by the Henry Reuter & Sons firm and they are very proud of it, because they believe it to be a fair representative of the work which can be done with this form of material.

The company are manufacturers of metal cornices, skylights and ventilators, and they installed the Lexington warm air furnace with which the house is equipped.

The snug, compact appearance of the roof and spouting work of this house certainly deserves commendation and it proves that the sheet metal contractor who tries can turn out an A-1 job. The owner of this house is well pleased with the roofing and heating job, both of which are giving good service.

United Sheet Metal Contractors Meet at Hardware Club, Chicago, July 26.

The United Sheet Metal Contractors of Chicago held an informal meeting at the Hardware Club, State and Lake Building, Chicago, Thursday evening, July 26.

A general discussion of sheet metal conditions was taken up by those present, Martin Gold presiding.

Following the meeting, a short vaudeville sketch was enjoyed, which was furnished by the Western Sheet Steel Company, Chicago.

Constant cultivation of your sales is the only sure way of getting a good crop.

Copper and Brass Ornaments Effectively Decorate Assembly Hall at St. Louis Convention.

Gerock Brothers, St. Louis, Take Advantage of Opportunity to Show How Metal Ornaments Can Be Used for Decorative Purposes.

WE HAVE learned a great deal about the uses of non-ferrous metals for roofing purposes, etc., and we know that much progress has been made in this field. Some firms have even gone so far as to prove, by the use of high tension electrical currents, that roofs of this character are greatly reducing the number of fires caused by lightning to buildings.

Gerock Brothers Manufacturing Company, St. Louis, Missouri, makers of sheet metal ornaments and statuary, however, took advantage of the splendid and unique opportunity offered them by the Sheet Metal Contractors' convention, held in St. Louis recently, of demonstrating the wonderful possibilities in these metals when used as ornaments for decorative purposes.

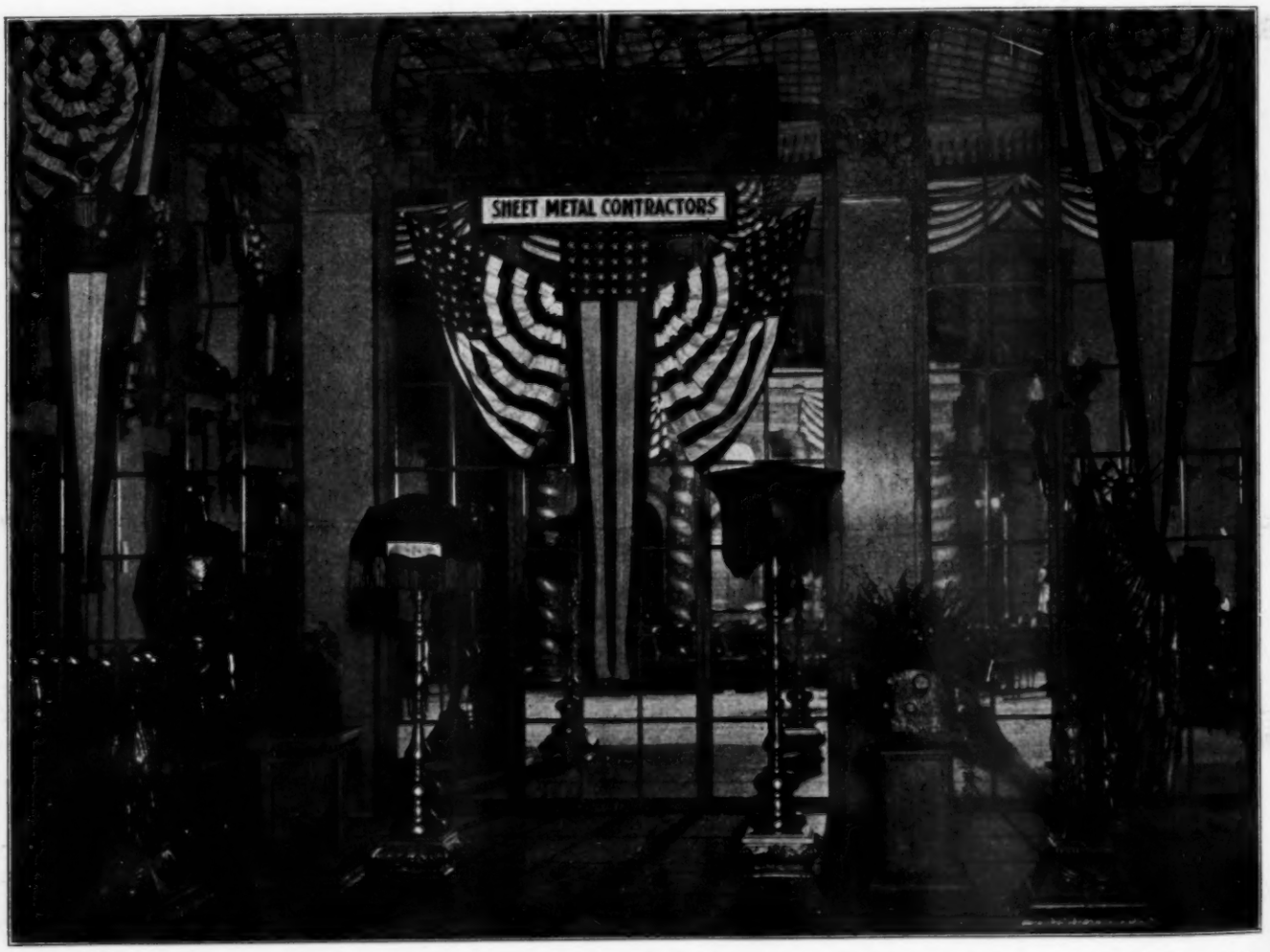
Who has not seen the beautiful and mysterious-looking brass lamps with their long and delicate fringes on the lamp shades in store windows? These lend a sort of aristocratic appearance to the entire setting of the window and enhance the value of other objects displayed therein.

The accompanying illustration shows how this live-wire firm took upon itself the task of decorating the assembly hall of the Statler Hotel, St. Louis, during the convention, and the results produced were certainly in accordance with the manner in which St. Louis does things when entertaining visitors.

The World War, of course, brought with it the inevitable demand for "In Memoriam" statues, and as will be seen by the metal statues of the "doughboy" in the illustration, the firm has not allowed itself to be outdone in this respect. The everlasting quality of copper has made this form of memory statue very desirable and popular.

Prominently placed in the foreground we observe two decorative lamps. The one on the left is made of copper, while the other is fashioned from brass.

In the way of moulding ornaments from these metals, nothing appears to be impossible. Note the plant jardinieres at the left and right of the lamps, which were made of zinc. These odd designs representing short blocks of a tree trunk are especially attractive departures from the plant jardiniere formerly on the



Group of Metal Ornaments Made from Copper and Brass by Gerock Brothers Manufacturing Company, St. Louis, with which the Assembly Hall of the Hotel Statler Was Decorated During the Convention.

market. The stands upon which they are placed are also constructed from metal and undoubtedly can be had in colors to match furniture.

The Goddess of Liberty in the background to the right hand side of the illustration is also made of copper and is an exact replica of the Statue of Liberty presented to the American people by France and which greets the traveler from abroad upon his entering the port of New York.

This group of decorative ornaments was well worked out in the hotel assembly hall and was highly appreciated by the visitors to the convention.

Detroit Sheet Metal Men Hold Monthly Meeting After Enjoying Sumptuous Chicken Dinner.

The Detroit Sheet Metal and Roofing Contractors' Association held its regular monthly meeting at Eastwood Inn, Detroit, July 23, 1923.

The meeting was preceded by a fairly late hour and the members chicken dinner, which was thoroughly enjoyed by thirty-five members of the Association.

After the dinner, those who were able, squeezed themselves upstairs to a room where the regular meeting was held.

Several subjects were discussed for the benefit of Sheet Metal and Roofing business, Michigan Standard coming in for its just share. More extensive field work among the members on cost systems, overhead expenses and fair prices will be taken up by Secretary D. M. Marshall.

A committee of three able men, "Bill" Busch, Al. Berschbach and "Tony" Basman, was appointed to arrange for an outing and field day at one of the several resorts near Detroit, to occur sometime in August. These three names on the committee are enough to assure everyone of a good time.

Our Frank, the genial state secretary, was a guest, as he always is when there is a "chicken" dinner around.

The meeting was adjourned at a disbanded feeling that it was an evening well spent.

Knebel's Park, Mequon, to Be Scene of Milwaukee Sheet Metal Contractors' Outing August 15.

Announcement is made by the Milwaukee Sheet Metal Contractors that the annual picnic of the Association will be held at Knebel's Park, Mequon, Wisconsin, August 15, 1923.

The entire picnic arrangements are in the hands of a general committee, composed of R. Jeske, Wm. Hammann and L. Eschenburg, with a subsidiary committee on music, whose chairman is Joseph M. Hollitz.

This picnic committee has been in charge of the Association's affairs for a great number of years and, therefore, it is needless to further elaborate on what is to be expected, as everyone who has attended previous affairs arranged by this committee knows that he will have the time of his life.

The present understanding is that all members and their friends will meet at a certain place, which has not been designated as yet, and proceed to the picnic grounds in their famous Cadillacs, Packards and Marmons.

Further informatioin will be sent to the members in due time, and it is well to watch the announcements in the AMERICAN ARTISAN in the future if you don't want to be left in the cold.

Convention of Tri-State Sheet Metal Workers' Association to Be Held at Norfolk, August 14 and 15.

The following is the program of the Tri-State Roofers' and Sheet Metal Workers' Association Convention to be held at Norfolk, Virginia, August 14 to 15, 1923. The special attention to the Virginia Sheet Metal Contractors is called to these dates:

Tuesday, August 14. 10 to 12 a. m. Opening of meeting by President C. H. Spann, of the Master Roofers' and Sheet Metal Workers' Association of Norfolk, Virginia.

Registration of representatives.

Address of Welcome by President C. H. Spann, Norfolk, Virginia.

Response by W. P. Budd, President of the Tri-State Association.

Tuesday, August 14. 2 to 4 p. m.

Organization and addresses by Edwin L. Seabrook, secretary of the National Association, George I. Ray, secretary of the Tri-State Association, M. W. Bohn, of the Norfolk Association, W. P. Budd, President of the Tri-State Association.

Tuesday, August 14. 7 to 9 p. m.

Dinner at seashore.

Wednesday, August 15. 10 to 12 a. m.

Complete organization — general discussions—adjournment.

Headquarters—Southland Hotel.

Meetings—Southland Hotel Ball Room.

Master Sheet Metal Contractors of Milwaukee Hold Meeting.

The following communication from John F. Graf, Secretary of the Master Sheet Metal Contractors' Association of Milwaukee, Wisconsin, contains the proceedings of a meeting of that organization held July 11, 1923:

The meeting was called to order at 8:15 by D. D. Green, Second Vice-President.

The minutes of the previous meeting were read and approved.

A lengthy report of the National Convention was given by the delegate, Frank Romberger. The delegates who attended the convention were well pleased with the program and entertainment arranged by the Saint Louis Association.

Paul L. Biersach, of the Trade Advancement Committee, reported the progress of the catalogue of Metal Trade Products, which is soon to be distributed.

It was decided that a picnic should be held some time during August, and Joseph Hollitz was elected to the picnic committee to assist in making arrangements.

John Bogenberger gave a report of the Employers' Council meeting.

A motion was then made and car-

ried to pay the dues to the Employers' Council. It was moved and seconded that the expenses of the delegates to the National Convention should be paid, and an order was drawn on the Treasury for $150.00 to pay the above expense. After a lengthy discussion of the labor situation, the meeting was adjourned at 10:30.

What Advertising Does and Why It Is Not an Expense.

Modern advertising has resolved itself into the ethics of competition. It seeks to persuade the buyer that the product offered is the best there is for his purpose and not that his competitor's product is the poorest. It gives to the buyer the assurance that the thing offered stands on its own merits and that it is simply taking the occasion to acquaint him with what those merits are.

Advertising creates business because it spreads knowledge of useful trade offerings. Advertising is never an expense. It does not add to the cost of production; it reduces it. According to the law of increasing returns, production costs decrease as production increases up to the limit of plant capacity, because each unit of production must bear its proportion of overhead and the more units produced the smaller is the proportion of the overhead chargeable to each unit.

How Great Is the Buying Power of Trade Paper Readers as Compared to Popular Medium Readers?

The buying power of 5,000 readers of the average trade paper is greater than that of 500,000 readers of the average popular medium, and the advertiser who will avail himself of the privilege of winning the acquaintance and confidence of those men through their own business journal will find a new and signal solution to the increasingly difficult problem of getting efficiency out of his advertising outlay.—*H. E. Cleland.*

The wages of sin regulate themselves.

Notes and Queries

Repairs for Prudential R Boiler.

From Stove Dealers' Supply Company,, 310 Chestnut Street, Milwaukee, Wisconsin.

Where can we obtain repairs for the Prudential R. Boiler?

Ans.—The Northwestern Stove Repair Company, 654 West Roosevelt Road, Chicago, Illinois.

Milk and Ice Cream Can Straightener.

From E. Gissinger Company, 129 State Street, Wauwatosa, Wisconsin.

Who manufactures a machine to straighten milk and ice cream cans?

Ans.—Thompson Bremer and Company, 1750 Carroll Avenue, Chicago, Illinois.

Seaman Safety Bracket.

From Whitney Metal Tool Company, Rockford, Illinois.

Who manufactures the Seaman Safety Bracket?

Ans.—Seaman Safety Bracket Corporation, Rochester, New York.

Monel Metal Sheets.

From John F. Cartwright, 224 Main Street, Bowling Green, Kentucky.

Who can furnish Monel Metal Sheets?

Ans.—Merchant and Evans Company, 347 North Sheldon Avenue, Chicago, Illinois; Williams and Company, 901 Pennsylvania Avenue, Pittsburgh, Pennsylvania.

Oil Burners.

From A. W. Hiller & Sons, 333 North Webster Street, Taylorville, Illinois.

Who manufactures Oil Burners for furnaces that burn crude oil?

Ans.—Winslow Boiler & Engineering Company, 65 E. Van Buren Street, Chicago, Illinois; Breeding Heat & Power Company, 310 Vine Street, Cincinnati, Ohio; Master Oil Burner Company, 351 W. 59th Street, Chicago, Illinois; Hauck Manufacturing Company, 136 10th Street, Brooklyn, New York.

Screw Nails.

From J. A. Lowden, Clarion, Iowa.

Kindly advise where we can obtain screw nails that can be driven in and screwed out.

Ans.—American Screw Company, 225 West Randolph Street, Chicago, Illinois.

Marquart Range.

From The Foster Stove Company, Ironton, Ohio.

Who manufactures the Marquart Range?

Ans.—The Champion Stove Company, Cleveland, Ohio.

Strip Shingles.

From Charles A. Changnon, Montpelier, Ohio.

Can you tell us where to obtain strip shingles?

Ans. — Milwaukee Corrugating Company, Milwaukee, Wisconsin; W. J. Burton Company, Detroit, Michigan; Berger Brothers Company, Philadelphia, Pennsylvania; Clark-Smith Hardware Company, Peoria, Illinois; Cortright Metal Roofing Company, Philadelphia, Pennsylvania.

Coke Tin Plate and Creamery Sheets.

From Louis F. Brandt, Glencoe, Minnesota.

Who manufactures Coke Tin Plates and Creamery Sheets?

Ans.—Merchant & Evans Company, 347 North Sheldon Street, Chicago, Illinois.

Traffic Regulation Devices.

From F. W. Lietz, Buckley, Illinois.

Can you give us the addresses of firms who sell traffic regulation devices electric lighted for use at intersections in towns?

Ans.—Electric Sign and Specialty Supply Company, 9 South Clinton Street, Chicago, Illinois, can furnish you with an electric lighted device such as described. The Automatic Sign and Signal Company, 1014 South Michigan Avenue, Chicago, Illinois, make traffic regulators which are illuminated by the reflection of the automobile headlights.

Sheet Aluminum.

From Nelson B. Case, 352 St. Clare Street, Havre de Grace, Maryland.

Who can furnish me with a small quantity of sheet aluminum about ⅛ inch in thickness?

Ans.—J. H. Jolley & Company, Philadelphia, Pennsylvania; Aluminum Company of America, Pittsburgh, Pennsylvania; Charles E. McInnes & Company, Philadelphia, Pennsylvania; Erdle Perforating Company, Rochester, New York; Michigan Smelting & Refining Company, Detroit, Michigan.

"Smith System" Furnace.

From Frank R. Jarrell, 213 East Main Street, Hoopeston, Illinois.

Who makes the "Smith System" furnace, as I desire repairs for it?

Ans. — Smith System Heating Company, 821 Washington Avenue, S. E., Minneapolis, Minnesota.

Carpenter's Interior Finishing Tool Display Featuring Planes Stimulates Business During Building Season.

Edgar W. Rahn Arranges Sales Increasing Window for Bond Hardware Company, Guelph, Ontario, Canada.

DURING the building season, particularly when the carpenter's work is largely interior finishing work, a tool display, such as the one shown, would be exceedingly helpful in increasing the sales and stimulating business.

A distinctive feature of the display is the plainly marked price which appears on each article.

The display was arranged by Edgar W. Rahn for the Bond Hardware Company, Guelph, Ontario, Canada.

Mr. Rahn makes the following comment:

"The best and most complete plane for interior work was put in the center of the window with its four boxes of cutters surrounding it. To point it out to the public distinctly, the different kinds of tapes were all hooked to two nails immediately in front and beside the plane, and then placed in different parts of the window, thus making them serve the purpose of streamers. This helped greatly to bring the desired attraction to the plane.

"On the paneled division at the right hand saws of all lengths, and with different sized teeth, were placed, also a few odd kinds of saws which would be in demand at this time.

"Resting against the paneled division were lathing hatchets which would be sure to be in demand, and farther back on the three elevations were displayed braces for all classes of work, auger bits in sets, and center bits of different sizes.

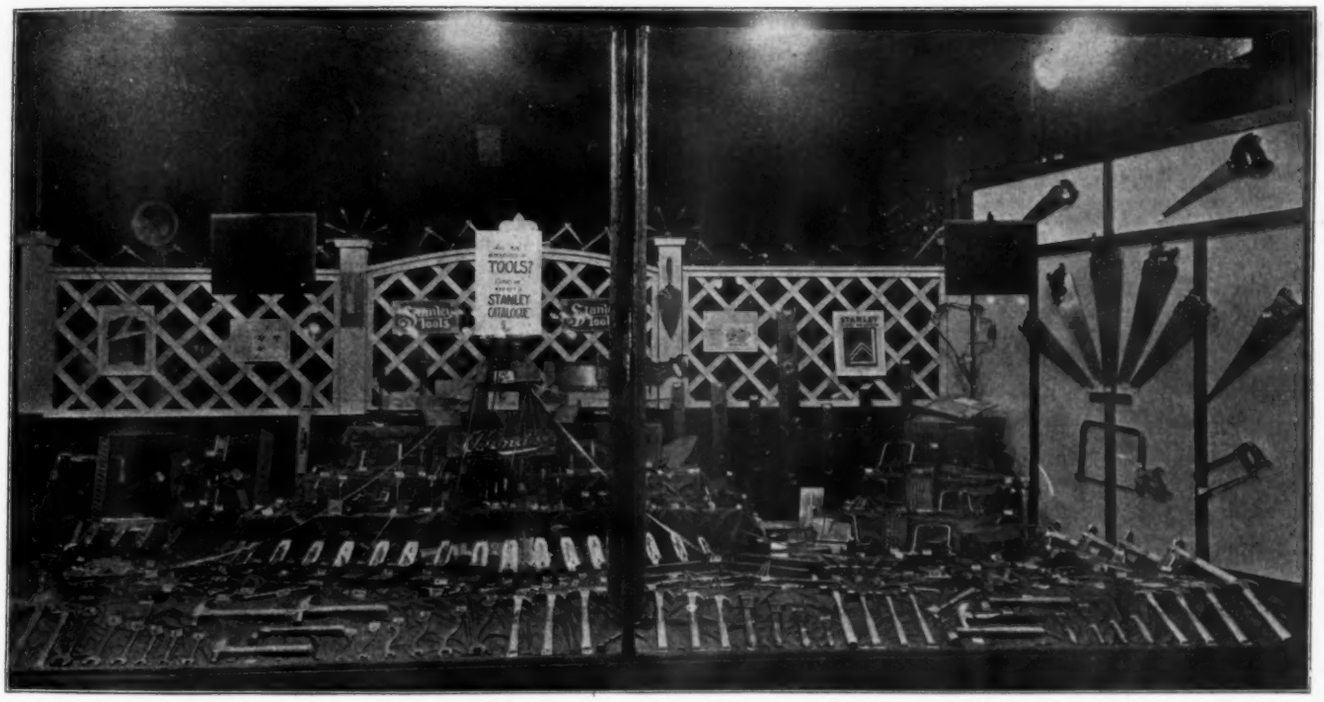
"On the three elevations surrounding the plane were placed, on the uppermost, two mitre boxes, and on the other two the smaller type of tools used by carpenters on inside work.

"Surrounding this elevated part was a complete line of planes, both wood and iron, and in front of them were small tools, such as automatic drills, ratchet and spiral screwdrivers, hand and chain drills, floor scrapers, chisels, try, mitre and bevel squares, wood gauges, spoke shaves, hammers, wrenches, etc.

"In the left hand corner of the window was a stand with small vises of useful sizes for light work.

"Immediately in front of the background on either side of the elevation were levels and squares which would also be in demand.

"The background was of the lattice type, which is not only appropriate for the season, but also permits the light to enter the store. To keep the background not only in conformity to the season, but also with the tools, rules were placed along the top as a trim, and on the lattice a number of cards in keeping with the goods shown. The two cards on the plate glass were to



Small Tool Window Display Which Created Large Sales During Building Season for Bond Hardware Company, Guelph, Ontario, Canada.

draw attention and the large one in the center of the window was to bring customers into the store.

"One of the greatest selling points of this window was that each tool was priced with an individual card for the benefit of prospective customers.

"These price cards saved much extra work which is caused by people coming in the store and asking prices of different tools in the window only for curiosity's sake, and it also helped in the making of sales, for the customer knew when he entered the store what price he would have to pay, and if he knows this, it is much easier to make a sale.

"I may say this, that this display sold a great number of tools, but a point of particular note was that it greatly increased the sale of the style of plane featured in the center.

Valuable Book on Trade Association Activities Issued by Department of Commerce.

The Department of Commerce, Washington, D. C., has released a new book entitled "Trade Association Activities." This book brings out the constructive purposes of trade organizations.

Commenting on the book, Secretary says:

"Just as a business house or an individual meets its obligations and carries on its daily relations within the community, so the trade association has a real individuality in the business fabric."

On the subject of statistics, Secretary Hoover says, in part: "There is no question but that the curves in the business cycle from activity to depression have been less disastrous in those industries or trades where accurate, lawful statistical data have been available to all. Fundamentally it is impossible for business men to form those vital judgments as to their future course of action in the wise and safe direction of their activities unless they are informed as to the changing currents of production and consumption, not only in their own lines but also in other lines of business, which indicate broader currents of economic life. The only criteria are statistics and if industry is to march with reasonable profits, instead of undergoing fits of famine and feast; if employment is to be held constant and not subjected to vast waves of hardship, there must be adequate statistical service. Whether these services are to be maintained by the government or by trade associations, they must be maintained if we are to have an orderly economic life."

With reference to cost accounting activities, Secretary Hoover pointed to the "truly remarkable findings of government agencies in the war years regarding the knowledge and understanding of costs in production and distribution. Losses often were confused with profits, those investigations showed, all for the lack of knowledge of the fundamentals of cost accounting. Today, the trade association is proving itself the most potent organized influence in the study of costs in industry and trade, aiming towards standard systems applicable to peculiar conditions. All of which tend to more scientific knowledge of business and ultimately lowered costs."

Credit and collection activities, trade disputes and ethics, insurance, public relations, traffic and transportation, commercial research, industrial research and government relations are among the other subjects discussed by Secretary Hoover in the introduction to the book, a volume of 368 pages, sold by the Superintendent of Documents, Government Printing Office, Washington, D. C., and by the field offices of the Department of Commerce at 50 cents a copy.

Tom Jones Runs on to a New Scheme for Increasing Sales Among Car Owner Class.

Uses the Ol' "Bean" to Bring in Trade That Was Going to Stores in Other Lines.

YOU, as well as many other dealers, have, doubtless, been wondering whether or not your window displays have been attracting as many people into the store as they possibly could. True enough, many people pass the window, stop and glance at the demonstration going on and pass on. How many of these people are actually brought to the point of making a decision in the right direction?

While walking along Fifth Avenue, New York, the other day, my attention was arrested by the sight of a man who had come out of a nearby store and had placed himself in front of the display window. He stood there scratching his head in a perplexed manner as if some weighty problem was troubling him.

Upon coming up to him, I recognized him as my old friend, Tom Jones, and said to him: "What seems to be the matter, Tom? You look as if the weight of the universe were on your shoulders."

"Well, you see," replied Tom, "I have spent a goodly little sum of money getting up this window display of mine here, but it does not seem to produce returns in proportion to the amount of money invested in it. People pass here in high-priced machines and on foot, patronizing the tailor's next door and the florist's down the street, but they don't seem to be interested in my window displays, and I was just trying to figure out what I could do to bring some of this trade into my store."

Before I could answer this perplexing question, Tom slapped himself upon the knee and exclaimed, "Ah, I have it," whereupon he ran into the store, leaving me standing in blank amazement on the sidewalk.

I saw Tom about a week later; he was all smiles and dimples, and on seeing me, he came up and said: "It worked great."

"What worked great?" cried I,

having forgotten all about the incident the week before when Tom left me standing in the street.

"Why, my scheme," said he. "You see, I ran upon a scheme whereby I could get the names and addresses of some of the people who were in the habit of visiting this street on shopping tours. I placed one of my clerks in a convenient window where he could take the numbers of all the cars that came down this street and stopped into some of the other stores. This done, I consulted the motor vehicle register and got the name which corresponded to the number which my clerk had taken. To these persons I dictated personal letters, stating that I was sorry not to have had the pleasure of a visit from them on (naming the date on which the number had been taken by my clerk) when they were visiting this street, incidentally mentioning that we had just received a new shipment of the improved gas range. I also inserted the card of our head sales manager and stated that Mr. ——— (naming the head sales manager) would be only too pleased to give them every consideration should they care to inspect our line the next time they were down."

The results of this scheme were unusually gratifying, and they were the means of disposing of a large number of washing machines and incidentally paving the way for future sales.

Government Asks Employers to Help Absorb Into Industry Trained Disabled War Veterans.

An appeal to business organizations to assist in absorbing into industry the three or four thousand disabled war veterans, who are completing government training courses monthly, has been made by the Chamber of Commerce of the United States. The National Chamber calls attention to the obligation which rests on the business interests of the country to cooperate with the government to the end that all of the men be given employment.

"The men who are being trained," says the National Chamber, "are trained in many lines and are prepared to meet adequately the physical and mental demands that their new occupations will place upon them. The government can only rehabilitate and train the men up to the point of employability. From this point the employing interests of the country must carry on."

Push Sales of Fire Extinguishers for the Home as Well as for Factory.

"It is a strange fact," declares one of the world's leading fire prevention authorities, "that men will provide factories and offices with elaborate systems of exit and life-saving devices to protect employes from fire, and then will erect homes to shelter their own families without a single precaution for saving their lives in a similar emergency."

Strange, indeed, and yet after all it is not quite inexplicable, for consistency, save under strict compulsion, is not among the most pronounced of man's virtues, and this is particularly true in regard to fire hazard. The naked truth is that of the 15,000 lives which annually are sacrificed to the flames in this country, no less than half are lost in dwelling house fires. During five years, then, the total approaches 37,500, or an average of twenty a day. That is a gruesome record, and one that clearly points to the need for strengthened and rigidly enforced building relations and fire laws. Only in that way, apparently, can people be defended against their own folly.

Provision of adequate and decent quarters for the country's expanding population is but another name for advancement; and whatever hampers this work of supplying housing accommodations, in view of the persistent shortage, whatever destroys homes that already are lamentably insufficient in number, strikes at the most vital part of America. By allowing fire to sweep away $321,453,878 of dwelling house property, as it did in the years 1917 to 1921, when a substantial percentage of this waste could have been stayed with a little conscious effort, the American public is guilty of conspiring against its own well-being.

Sharon E. Jones Says, Cut Wages Last in Reducing Expenses.

Sharon E. Jones, Secretary of the Pennsylvania & Atlantic Seaboard Hardware Association, speaking on reduction of costs, says:

"Don't begin with the payroll; it is false economy. Many good clerks are asking for positions as traveling men because they can't get enough in the store. The majority of dealers throughout the country are not paying clerks enough so that they can earn an honest living, maintain their families and educate their children. It is important to encourage good salesmen and to train them to know and to sell merchandise.

"As dealers you put money into business, into fixtures, into goods, but not into men. That's where it's needed most. We should recognize the fact that labor is worthy of its hire."

Adopt Standard Sizes for Wood Screws.

At least two systems of numbering wood screws to designate the diameter have been used in the past, methods of measuring lengths have been at variance, and the number of threads per inch for a given size have not been the same for different makes. All this confusion has been eliminated and the dimensions of wood screws made uniform throughout the United States as the result of a coöperation agreement among the manufacturers, the Bureau of Standards and the Technical Committee on Builders' Hardware of the Federal specifications boards. Much confusion will be eliminated, it is thought.

The system of numbering to be used henceforth is the same as that now used in designating machine screw sizes, except that diameters above number 12 are also designated by numbers. This means, for example, that a number 10 wood screw

will have the same diameter as a number 10 machine screw. Uniform methods of measuring diameters and lengths, and uniform tolerances in diameters and lengths were adopted, together with a standard angle for the under side of the heads of flat and oval head screws.

The number of sizes of brass and steel screws manufactured as standard were reduced from 555 to 291, a reduction of 47 per cent, and at the same time a sufficient variety was retained to answer every need. This reduction should benefit the manufacturer, the dealer and the user. The above standards have been incorporated into a United States Government specification for wood screws, officially adopted by the Federal Specifications Board for use in all government purchases of wood screws, and issued as Bureau of Standards Circular Number 140.

Hoover Says That Hard Times Are Not Unavoidable.

During an address which Herbert Hoover delivered he made the following statement: "We have no need to go into a period of inflation. We are, undoubtedly, on a plane of prosperity, and we wish to hang on to the prosperity. I am not one of those who believe that hard times have any special advantage in disciplining our souls. We ought to be able to discipline ourselves in prosperity when we have time to do it, and having achieved prosperity, we should be able to hold onto it."

The Newsboy Could Not Read, But He Realized Necessity for Advertising.

An illiterate negro newsboy ran up to Senator "Sorghum" as he was going down the steps of the Capitol at Washington, and begged him, "Boss, read me something to holler about."

That boy had the insight of a successful merchant. He knew that he could sell more papers by hollering his wares than he could be waiting for customers to come to his stand.

AMERICAN ARTISAN AND HARDWARE RECORD and other trade magazines are full of advertising suggestions. Every article handled by the average retail hardware man is worth "hollering about," through your show windows, your newspapers, your personal letters, over your telephone, and through such excellent service that every one of your customers becomes a booster. You don't have to ask someone to give you pointers about your stock; lots of it will speak for itself if you'll give it a chance by the proper display.

Coming Conventions

The National Hardware Association and the American Hardware Manufacturers' Association, Atlantic City, New Jersey, October 16, 17, 18 and 19. F. D. Mitchell, 1819 Broadway, New York, is Secretary and Treasurer of the Manufacturers; T. J. Fernley, Secretary of Jobbers.

The twenty-fourth annual convention of the National Federation of Implement Dealers' Associations will be held at Hotel Sherman, Chicago, October 17, 18 and 19, 1923. H. J. Hodge, Abilene, Kansas, is Secretary.

Mountain States Hardware and Implement Association Convention, City Auditorium, Denver, Colorado, January, 1924. W. W. McAlister, Secretary-Treasurer, Boulder, Colorado.

Western Retail Implement and Hardware Association, Missouri Theater Building, Kansas City, January 15, 16, 17, 1924. H. J. Hodge, Secretary-Treasurer, Abilene, Kansas.

The West Virginia Retail Hardware Association, Convention and Exhibit, Huntington, West Virginia, January 15 to 18, 1924. James B. Carson, Secretary-Treasurer, 1001 Schwind Building, Dayton, Ohio.

Kentucky Hardware and Implement Association, Louisville, January 24-25, 1924. J. M. Stone, Secretary-Treasurer, 202 Republic Building, Louisville.

Indiana Retail Hardware Association, Inc., Convention and Exhibition, Cadle Tabernacle, January 29, 30, 31, February 1, 1924. G. F. Sheely, Secretary, Argos.

Wisconsin Retail Hardware Association Convention and Exhibition, Milwaukee Auditorium, February 6, 7, 8, 1924. George W. Kornely, Manager of Exhibits, 1476 Green Bay Avenue, Milwaukee. P. J. Jacobs, Secretary-Treasurer, Stevens Point.

Michigan Retail Hardware Convention and Exhibition, Grand Rapids, February 12, 13, 14, 1924. Karl S. Judson, Exhibit Manager, 248 Morris Avenue, Grand Rapids. A. J. Scott, Secretary, Marine City, Michigan.

The Pennsylvania and Atlantic Seaboard Hardware Association, Incorporated, convention and exhibition at the Philadelphia Commercial Museum, Philadelphia, Pennsylvania, February 12, 13, 14 and 15, 1924. Sharon E. Jones, Secretary-Treasurer, Wesley Building, Philadelphia.

New York Retail Hardware Association Convention and Exhibition, February 19, 20, 21, 22, 1924. Headquarters, McAlpin Hotel, and Exhibition at Seventy-First Regiment Armory. John B. Foley, Secretary, 412-413 City Bank Building, Syracuse.

The Ohio Hardware Association, Convention and Exhibit, Cincinnati, Ohio, February 19 to 22, 1924. James B. Carson, Secretary-Treasurer, 1001 Schwind Building, Dayton, Ohio.

Retail Hardware Doings

California.

B. C. Petticrew will have charge of the automobile replacement and accessory department of the Jones Hardware Company of Porterville, who are taking over this section of the C. R. Oglesby business.

The Walter Scott Company of Selma is constructing a new store at Big Creek, which it will open shortly as a hardware and sporting goods shop.

J. C. Hutchison and J. A. Godwin are the new owners of the Broadway Hardware store at 206 West Broadway, Glendale.

Indiana.

Frank J. Richards has purchased the interest of Frank Fox in the Fox and Plattner Hardware Store of Columbia City and the firm will now be known as Fox and Richards.

Iowa.

Barney Peterson of Clinton has sold his hardware store to C. Boysen of Lyons.

Michigan.

At L'Anse, a new firm, the Baraga County Hardware Company, has purchased the Hansen Hardware Store. A complete line of hardware will be carried.

Minnesota.

C. O. Bergen, an experienced hardware man of Rochester, has bought the hardware business conducted for many years at Hayfield by John J. Nelson

The B. J. Keppers Hardware Store at Avon has been sold to N. F. Thielman, who is putting in a new stock.

Missouri.

E. K. George is now sole owner and manager of the Belton Hardware Store of Moseley & George, as George E. Moseley, has retired from active business.

Nebraska.

Ed H. Oswald will manage the hardware store at Bloomfield, which he recently purchased from John Trierweiler.

G. A. Shindler, hardware merchant of Hemingford, whose building was recently gutted by fire, has contracted for a new building on the same corner location, and expects to put in a larger and more complete stock than before.

Ohio.

The Worrell Hardware Store of Cygnet will move its stock to Findlay where it will open a store at 304 North Main street.

Texas.

Tips Hardware Company, recently incorporated for $250,000, is planning extensive improvements to its San Antonio store.

Wright Hardware Company Appeals to Imagination of Prospect to Force Attention.

Designer of Oven Heat Regulator Display Employs Principles of Association Successfully in Concentrating and Intensifying Interest.

WE ARE told by eminent psychologists that the power of any object, or group of associated objects, to force itself into our attention depends upon the absence of counter attractions, together with the intensity of the sensation aroused and the comparative ease with which we are able to comprehend the meaning or utility value of the object.

These principles are very well worked out in the accompanying window display of the Lorain Oven Heat Regulator arranged in the window of Al. G. Wright Hardware Company, Arkansas City, Kansas.

Lorain Oven Heat Regulator Window Display Arranged for the Al. G. Wright Hardware Company, Arkansas City, Kansas.

If the power of this window display to force itself upon our attention is measured by the absence of counter attractions, then we can count this power as almost 100 per cent, as there are no counter attractions, unless possibly the two palms could be called such. Here you see nothing but a group of associated objects all bending their efforts toward the one ultimate climax, that of forcing your attention upon the Lorain Oven Heat Regulator.

Note how cleverly the window designer has proceeded to increase the utility value of the Regulator. He has forced your attention and concentrated it upon one object by displaying all of these appetizing sweets and canned fruits, in order to enhance in your mind the utility value of the Lorain Oven Heat Regulator. He has placed you into a receptive state of mind and each of the objects displayed is so closely associated and correlated to its neighbor, and the whole is so easily comprehensible that you simply cannot miss the point of the display. "Can it be true that such delicious dishes are possible with so little effort?" Almost incredulous, and still there they are, ready to be tasted if necessary to prove the veracity of the statemnts made regarding the regulator.

This window display is bound to produce inquiries and lead to sales; it is simply irresistible; it is one which has been worked on scientific principles acquired by tests and experimentation.

The stove display in this window is a Direct Action of the American Stove Company.

It is the purpose of all advertising and window display to call forth an activity in the mind of the prospect favorable to the making of a sale. It is always desirable to enhance the value of the object in the mind of the person acted upon by appealing to his imagination in such a way as to make him see himself enjoying the objects.

Who Makes Wizard Oil Cook Stove?

To AMERICAN ARTISAN:

Can you give us the name and address of the makers of "Wizard" oil cook stoves?

McGUIRE-TYMESON COMPANY.

Johnstown, New York, July 27, 1923.

District of Columbia Court of Appeals Holds Business Consummated Over Phone Binding.

A decision of the District of Columbia Court of Appeals, recently made at Washington, is that a business transaction negotiated by means of the telephone, telegraph or mails is as binding upon the individuals or firms interested as when negotiated verbally or by means of signed contracts or written orders, according to the *American Metal Market*.

Even though the identity of the person receiving the message is difficult to establish, the person sending the message has the right to assume that the person at the receiving end is actually the one desired, provided that the matter is acted upon or action brought about as a result of the call, is in accordance with the court ruling.

With regard to letters and telegrams, the Court holds that the sender has a right to assume that the person for whom these communications are intended actually received them if the desired action or non-action follows their receipt. The receiver of these communications also has the right, the Court said, to assume that they come from where they purport to come and from whom they purport to come.

The Utility Value of the Advertised Article Must Be Made to Seem Large, While the Means of Securing It Must Seem Easy.

Determine What Points Your Goods Have Which Will Be Assimilated by the Prospect, Then Permit Him to See Himself Enjoying the Article or the Things Made Possible by Its Possession.

IT is generally conceded by successful advertisers that the ad should contain some method of attracting involuntary attention. In the accompanying illustration, however, the copy writer has undoubtedly depended upon the illustration to attract attention and tell the story. Under these circumstances it may perhaps be considered unnecessary to use a head line.

The illustration in this case is exceedingly well chosen and its location is also well thought out.

The quoting of prices always lends definiteness to the ad. The prospective purchaser knows exactly where he stands by reading this ad; there is nothing left to doubt; the size and the price of the article and where it can be had are clearly stated.

This ad is got up very well and no doubt brought many customers into the store for the freezers and lawn mowers.

* * *

The accompanying advertisement, which is reprinted from the Boone, Iowa, *Pioneer*, is very good as a card used for keeping the firm name before the public.

The pulling power of the ad would have been greatly increased had the copy writer made the headline embody some short, criptic, catchy phrase. This would have served the purpose of attracting attention and holding interest long enough to get the reader to continue to read the entire ad. The name and address should under no circumstance be separated.

T. W. Guy, President. Jas Troughear, Sec'y and Mgr

Johnson Hardware Co.

Dealers in

Builders Hardware, Carpenter Tools, Shelf and heavy Hardware, Paint, Lead, Oil, Paint Brushes.

We do Spouting of all kinds

718 Story St.

If it is desired to have the names of the firm members appear in the add, these should be placed near the bottom, rather than at the top.

To improve the ad the bottom lines "We do spouting of all kinds" could have been used as a headline with some slight rewording.

Trade Weakness Continues—Fall Outlook Increasingly Promising—Freight Movements Continue Large.

Seasonal Fluctuation of Demand Responsible for Recent Recessions—Non-Ferrous Metal Prices Show Firm Tendency.

THE steel and iron industry produced the best news of the week. After two months of dwindling orders, it now is stated that new business is showing a definite tendency toward expansion, although back orders all along have enabled the mills to maintain a high rate of operations.

There is an underlying feeling that England's effort to effect a settlement of the European tangle will bear fruit, this notwithstanding the tone of Premier Poincare's speech last Sunday and also notwithstanding the delay in the forwarding of England's note to the other Allies.

The situation in Europe has reached such a hopeless stage that it would seem that the time is ripe to induce both France and Germany to modify their respective attitudes and make it possible to bring about a practical settlement.

Domestic conditions remain substantially the same as for several weeks past and as order books are becoming depleted the tendency in all directions is towards smaller operations. It is to be expected, however, that buyers would be galvanized into action on the first definite indication that the European situation was responding to the treatment recently started by Premier Stanley Baldwin.

Railway earnings reports for June, now being issued, indicate that the carriers generally are doing well. But it is one of the ironies of the situation that the roads serving the western grain states are making the least prosperous showing, although bearing the brunt of the clamor for reduction in freight rates.

Copper.

The copper consumers are still testing the market, but are doing no buying. Lower prices are not much in evidence.

Producers report a few tentative inquiries from consumers, inquiries simply put out to keep in touch with the market without apparently any intention of buying. There seems to be no desire to buy, it would probably be just exactly the same if producers were to ask 14.62½ cents or even 14.50 cents delivered as was tried out last week without attracting buyers.

There is no 14.50 cents delivered copper offered. The fact is at the moment there is absolutely no demand. It is not a matter of price, it is a matter of mind and behind that possibly the orders on their books over the balance of the year do not show up as well as they did six months ago.

Tin.

The tin market is dull and easy, despite the firm London undertone. Even offers to sell Straits at 39.50 cents for future deliveries have failed to attract buyers.

The steadiness of the London market has not stimulated trading here, and offers to sell at ¼ cent to ⅜ cent below the importers' limits have failed to uncover any buying interest.

Straits tin for delivery from steamers at dock is offered at 39.62½ cents; and futures are available at 39.50 cents. These prices apply on carload lots while for 5-ton lots sellers ask ⅛ cent more and for less than 5 tons ½ cent more. The same differentials have been in force for some time.

There is no change in the position of Banka or 99 per cent tin and these grades are respectively quoted at ¼ cent and ½ cent below Straits.

Lead.

The western lead market is a little stronger than it was last week, with prices irregular, however, and little offering for July.

Some holders of spot lead in the west are reported asking as high as 6.50 cents East St. Louis basis for immediate delivery. Producers, however, are making considerably lower prices than this to regular consuming trade though they have but little to spare before August, today's quotations on this class of business being around 6.20 cents and sales for August are already large.

Speculative buying interest especially in futures is keen, but it is difficult to secure offerings at fixed prices at anywhere near the present nominal market.

Prompt is quoted at St. Louis, 6.15 to 6.25 cents; July, 6.15 to 6.25 cents; August, 6.15 to 6.25 cents.

Zinc.

The zinc market is steady and unchanged from last week.

Attempts to buy zinc at 6.05 cents, East St. Louis, are unsuccessful and buyers are forced to pay 6.10 cents which pertains to July and August material. September being quotated 5 points higher.

There is but little domestic consuming demand, orders on inquiries for more than carload lots being rare. Operators, however, have shown more buying interest, but no advance has been realized in prices.

The quotations at East St. Louis are: July, 6.10 cents; August, 6.10 cents; September, 6.15 cents; October, 6.20 cents.

Solder.

Chicago warehouse prices on solder are as follows: Warranted 50-50, $24.50; Commercial, 45-55, $22.75, and Plumbers', $21.00.

Tin Plate.

The prediction is made in a well informed quarter that there will be tin plate requirements during the

remainder of this year to cover all the output possible. This is predicated, of course, not on production at capacity but on production at the rate that seems likely to be possible on the basis of the rate the mills are now able to maintain.

On an operating basis, the tin plate industry is running at between 75 and 80 per cent. The estimate refers to turns worked compared with the total number of mills working full time. The actual tonnage output is probably somewhat less than normal in proportion to the operating rate, as hot weather tends to cut down outputs per mill per turn. While this is not an extremely light operation for this particular time of year it involves a shortage from what the mills would like to do, for the reason that for quite a while past the tonnage has been below what the mills were striving to turn out.

There continues to be heavy pressure upon mills for deliveries against old orders, this coming particularly from the makers of packers' cans, though there is also pressure from some oil interests, due to oil exports being heavier than was anticipated. There is a possibility that the can makers are overestimating their requirements. If they are not, it is altogether probable there will be a distinct shortage in tin plate next month.

The market is quotable firm at $5.50 per base box for 100-pound cokes.

Sheets.

A better sentiment is shown in the current sheet market than for the past three weeks.

Consumers during this period showed marked concern about prices and made little effort to purchase tonnage unless of a spot character at bargain prices.

This week the tone of the market is improved. While buyers are not inclined to disregard prices altogether, still there is less of a tendency to do so.

Consumers participating in the present market are more interested in the time of shipment than any other objective and where orders already are under contract they are pressing for delivery.

Despite the low stage of new business entered during July prices have been holding firm and continue unchanged at 3.00 cents for blue annealed, 3.85 cents for black and 5.00 cents for galvanized, base, Pittsburgh.

Some producers of blue annealed are quoting 3.25 cents on blue annealed where the tonnage involved is small and attractive delivery is desired.

Producers of high-grade sheets report a good volume of business is booked.

Unless holdup orders are received against business already in hand, little open tonnage will be available until well into September.

Fine finished stock continues quotable at 5.35 cents, Pittsburgh, for 22 gage.

Old Metals.

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $21.00 to $21.50; old iron axles, $27.00 to $27.50; steel springs, $22.00 to $22.50; No. 1 wrought iron, $15.50 to $16.00; No. 1 cast, $18.50 to $19.00, all per net tons. Prices for non-ferrous metals are quoted as follows, per pounds: Light copper, 9½ cents; light brass, 5 cents; lead, 4¼ cents; zinc, 3½ cents; and cast aluminum, 15 cents.

Pig Iron Prices Have About Reached Bottom; Activity Grows in Pittsburgh Iron Market.

Inquiry Much Improved at Chicago—Few Sales Are Made in Birmingham, Quotations Are Uncertain, but Shipments Are Steady.

THE pig iron market may fittingly be described as stagnant. The condition may be normal for the particular circumstances existing, but it is far from normal in the sense of normal meaning a general average, for if consumers were operating at only one-half or even one-third capacity they would in the long run have to buy more iron than is being bought now or has been bought in the past few weeks. In a prolonged period of light operation there are purchases nearly every day. The particular condition now is that consumers are not done with the purchases they made when they were buying fair sized tonnages ahead, are not willing to repeat such purchases, and have not gotten to the point where they have to make hand-to-mouth purchases.

Foundry iron is held by valley furnaces at $26.00, furnace, and it is understood that most if not all of the Westinghouse iron went at this figure. There is iron to be had at $27.27, delivered Pittsburgh, making a valley equivalent 50 cents less, and this gives the quotable market range.

A steel casting concern in the Pittsburgh district has just bought a couple hundred tons at the $26.50 equivalent, or at $28.27, delivered Pittsburgh, but the iron comes from a producer east of Pittsburgh having the same rate into Pittsburgh as the valleys, $1.77.

Basic iron remains quotable at $25.00 valley. It is understood there is a little iron in middle hands, a few thousand tons, that could be bought at a shade under this basis.

More signs of revival are being shown in pig iron, as prices having gone below the cost line for some producers, now appear better stabilized. More merchant furnaces have gone out of blast and others are less inclined to meet minimum quotations.

At Buffalo, the valleys and elsewhere some sellers have stiffened up their schedules 50 cents to $1. Buyers still are feeling their way, but new orders and inquiry are heavier.

New York reports sales of 30,000 tons this week and Cleveland a fair total. A Phillipsburg, New Jersey, pipemaker bought 25,000 tons.

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS

PIG IRON.

Chicago Foundry	28.00 to 28.50
Southern Fdy. No. 2	31.01 to 33.01
Lake Sup. Charcoal	36 65
Malleable	28.00 to 28.50

FIRST QUALITY BRIGHT TIN PLATES.

			Per Box
IC	14x20	112 sheets	$12 45
IX	14x20		14 65
IXX	14x20	56 sheets	17 57
IXXX	14x20		15 12
IXXXX	14x20		18 65
IC	20x28	112 sheets	27 50
IX	20x28		29 85
IXX	20x28	56 sheets	16 15
IXXX	20x28		17 20
IXXXX	20x28		18 25

TERNE PLATES.

				Per Box
IC	20x28,	40-lb.	112 sheets	$25 60
IX	20x28,	40-lb.	" "	28 50
IC	20x28,	30-lb.	" "	21 80
IX	20x28,	30-lb.	" "	24 70
IC	20x28,	25-lb.	" "	20 80
IX	20x28,	25-lb.	" "	23 70
IC	20x28,	20-lb.	" "	18 30
IV	20x28,	20-lb.	" "	21 15
IC	20x28,	15-lb.	" "	17 05
IC	20x28,	12-lb.	" "	15 75
IC	20x28,	8-lb.	" "	14 05

COKE PLATES.

Cokes, 80 lbs., base, 20x28.	$14 05
Cokes, 90 lbs., base, 20x28.	14 30
Cokes, 100 lbs., base, 20x28.	14 65
Cokes, 107 lbs., base, IC 20x28	15 10
Cokes, 135 lbs. base, IX 20x28	17 15
Cokes, 155 lbs. base, 56 sheets	9 30
Cokes, 175 lbs. base, 56 sheets	10 10
Cokes, 195 lbs. base, 56 sheets	10 95

BLUE ANNEALED SHEETS.

Base ..... per 100 lbs.	$4 00

ONE PASS COLD ROLLED BLACK.

No. 18-20 ..... per 100 lbs.	$5 00
No. 22-24 ..... per 100 lbs.	5 05
No. 26 ..... per 100 lbs.	5 10
No. 27 ..... per 100 lbs.	5 15
No. 28 ..... per 100 lbs.	5 20
No. 29 ..... per 100 lbs.	5 30

GALVANIZED.

No. 16 ..... per 100 lbs.	$5 60
No. 18-20 ..... per 100 lbs.	5 75
No. 22-24 ..... per 100 lbs.	5 90
No. 26 ..... per 100 lbs.	6 05
No. 27 ..... per 100 lbs.	6 20
No. 28 ..... per 100 lbs.	6 35
No. 30 ..... per 100 lbs.	6 85

BAR SOLDER.

Warranted. 50-50 ..... per 100 lbs.	24 50
Commercial. 45-55 ..... per 100 lbs.	22 75
Plumbers ..... per 100 lbs.	21 00

ZINC.

In Slabs	6 18

SHEET ZINC.

Cask lots, stock, 100 lbs.	11 00
Less than cask lots, 100 lbs.	11 50

BRASS.

Sheets, Chicago base	23½c
Mill Base	22¾c
Tubing, brazed, base	28½c
Wire, base	19¼c

COPPER.

Sheets, Chicago base	23¾c
Mill Base	22¾c
Tubing, seamless, base	27c
Wire, No. 9 & 10 B. & S. Ga.	22¼c
Wire, No. 11 B. & S. Ga.	22c
American Pig	6 50
Bar	7 50
Sheet. Full Coils ..... per 100 lbs.	10 25
Cut coils ..... per 100 lbs.	11 25

TIN.

Pig Tin ..... per 100 lbs.	39 25
Bar Tin ..... per 100 lbs.	40 25

HARDWARE, SHEET METAL SUPPLIES, WARM AIR HEATER FITTINGS AND ACCESSORIES.

ADZES.

Coopers'. Barton's	Net
White's	Net

AMMUNITION.

Shells, Loaded, Peters. Loaded with Black Powder	18%
Loaded with Smokeless Powder	18%
Winchester. Smokeless Repeater Grade	20 & 4%
Smokeless Leader Grade	20 & 4%
Black Powder	20 & 4%
U. M. C. Nitro Club	20 & 4%
Arrow	20 & 4%
New Club	20 & 4%
Gun Wads—per 1000. Winchester 7- 8 gauge	10&7½%
" 9-10 gauge	10&7½%
" 11-28 gauge	10&7½%

ASBESTOS.

Paper up to 1/16	6c per lb.
Rollboard	6¼c per lb.
Millboard 3/32 to ¼	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6.00 per roll

AUGERS.

Boring Machine	40&10%
Carpenter's Nut	50%
Hollow. Stearns, No. 4, doz.	$11 50
Post Hole. Iwan's Post Hole and Well	35%
Vaughan's, 4 to 9 in.	$15 60

AXES.

First Quality, Single Bitted (unhandled, 3 to 4 lb., per doz.	$14 00
Good Quality, Single Bitted, same weight, per doz.	13 00

BARS, CROW.

Steel, 4 ft., 10 lb.	$ 80
Steel, 5 ft., 18 lb.	1 40
Pinch bars, 5½ ft., 24 lb.	1 60

BARS, WRECKING.

V. & B. No. 12	$0 34
V. & B. No. 24	0 43
V. & B. No. 324	0 57
V. & B. No. 30	0 48
V. & B. No. 330	0 63

BITS.

All Vaughan and Bushnell. Screw Driver, No. 30, each	$ 27
Screw Driver, No. 1, each	16
Reamer, No. 80, each	41
Reamer, No. 100 each	41
Countersink, No. 13, each	20
Countersink, Nos. 14-15 each	27

BLADES, SAW.

Wood. Atkins 30-in. Nos.	6	40	26
	$8 90	$9 45	$5 40

BLOCKS.

Wooden	45%
Patent	45%

BLOW TORCHES (See Firepots).

BOARDS.

Stove.			Per Doz.
26x26,	wood	lined	$14 45
28x28,	"	"	16 95
30x30,	"	"	19 00
26x26,	paper	lined	8 15
28x28,	"	"	9 10
30x30,	"	"	10 80

Wash.			
No. 760,	Banner	Globe (single) per doz.	$5 25
No. 652,	Banner	Globe (single) per doz.	6 75
No. 801,	Brass	King, per doz.	8 25
No. 860,	Single—Plain	Pump	6 25

BOLTS.

Carriage, Machine, etc. Carriage, cut thread, ⅜x6 and sizes smaller and shorter	45-5%
Carriage sizes, larger and smaller and shorter	40-5%
Machine, ⅜x4 and sizes smaller and shorter	50%
Machine, sizes larger and longer than ⅜x4	40-10%
Stove	70-5%

BRACES, RATCHET.

V. & B. No. 444 8 in.	$4 54
V. & B. No. 222 8 in.	3 89
V. & B. No. 111 8 in.	3 55
V. & B. No. 11 8 in.	3 02

BURRS.

Copper Burrs only	30%

BUTTS.

Steel, antique copper or dull brass finish—case lots—3½x3½—per dozen pairs	$3 48
4x4 ..... " " "	4 74
Heavy Bevel steel inside sets, case lots—per dozen sets	8 00
Steel bit keyed front door sets, each	2 00
Wrought brass bit keyed front door sets, each	4 00
Cylinder front door sets, each	8 50

CATCHERS, GRASS.

Wire frame, adjustable bottom, white duck, for 12" to 16" mowers, dozen	$9 00
Same kind for 16" to 20".	10 50

CEMENT, FURNACE.

American Seal, 5 lb. cans, net	$ 45
" " 10 lb. cans, "	90
" " 25 lb. cans, "	2 00
Asbestos, 5 lb. cans "	45
Pecora ..... per 100 lbs.	7 51

CHAINS.

Proof Coil, ⅜" 100 lbs.	$ 9 75
Amercain Coil	40-10%
Electric Cow Welded Ties No. 00, 4½, per doz.	3 00
Sher. Steel Safety Chain. 500-ft. coil, per ft.	.01½
100 to 500 ft., per ft.	.02
Less than 100 ft., per ft.	.02½
Iron Jack Chain. Box (12 yds.)	.45

CHIMNEY TOPS.

Iwan's Complete Rev. & Vent.	30%
Iwan's Iron Mountain only	35%
Standard	30 to 40%

CHISELS.

Cold. V. & B. No. 25, ¼ in., each	$0 26
V. & B. No. 25, ⅝ in., each	41
Diamond Point. V. & B. No. 55, ¼ in.	0 31
V. & B. No. 55, ½ in.	0 48
Firmer Bevelled Round Nose. V. & B. No. 65, ¼ in.	0 29
V. & B. No. 65, ½ in.	0 40
Socket Firmer. Cape. V. & B. No. 50, ⅜ in.	0 31
V. & B. No. 50, ¾ in.	0 57

CHUCKS, DRILL.

Goodell's, for Goodell's Screw Drivers	List less 35-40%
Yankee, for Yankee Screw Drivers	$6 00

CLAMPS.

Adjustable. Martin's	30%
No. 63, Screw	20%
No. 100, Door (Stearns) doz.	$22 00
Carpenters'. Steel Bar.	List price plus 20%
Carriage Makers'. 2½-inch ..... per doz.	$ 7 00
5 - " ..... "	14 00
8 - " ..... "	28 00
12 - " ..... "	42 00
Hose. Sherman's brass, ¾-inch per doz.	$0 48
Double, brass, ¾-inch, per doz.	1 20

CLIPS.

Damper. Acme, with tail pieces, per doz.	$1 25
Non Rivet tail pieces, per doz.	25

COPPERS—Soldering.

Pointed Roofing.		
3 lb. and heavier	per lb.	40c
2½ lb.	"	45c
2 lb.	"	48c
1½ lb.	"	55c
1 lb.	"	60c

CORD.

No. 7 Std. per doz. banks	$10 80
No. 8 " " " "	12 50

CORNICE BRAKES.

Chicago Steel Bending. Nos. 1 to 6 B.	10%

COUPLINGS, HOSE.

Brass ..... per doz.	$2 25

CUT-OFFS

Kuehn's Korrekt Kutoffs: Galv., plain, round or cor. rd. Standard gauge	40%
26 gauge	10%

DAMPERS.

"Yankee" Hot Air.			
7 inch, each	20c,	doz.	$1 75
8 " "	25c,	"	2 40
9 " "	30c,	"	2 75
10 " "	32c,	"	3 00

Smoke Pipe.		
7 inch, each		$ 35
8 " "		40
9 " "		50
10 " "		60
12 " "		90

Reversible Check.		
8 inch, each		$1 50
9 " "		1 70

DIGGERS.

Post Hole. Iwan's Split Handle (Eureka) 4-ft. Handle	per doz. $14 00
7-ft. Handle	per doz. 36 00
Iwan's Hercules pattern, per doz.	14 90

DRILLS.

V. & B. Star, 12-inch Length. ¼, 5/16 and ⅜, each	$ 25
⅝, each	36
1, each	54
1¼, each	81
V. & B. Star, 18-inch Length. 5/16 and ⅜, each	$ 33
⅝, each	45
1, each	69
1¼, each	1 05

EAVES TROUGH.

Milcor	
Galv. Crimpedge, crated	70-5%

ELBOWS—Conductor Pipe.

Milcor	
Galv., plain or corrugated, round flat. Crimp, Std. gauge	60%
26 Gauge Std. gauge	40%
24 Gauge Std. gauge	10%
Square Corrugated. Milcor	
Standard gauge	45%
26 gauge	30%
Portico Elbows. Standard Gauge Conductor Pipe, plain or corrugated. Not nested	70 & 5%
Nested solid	70 & 5%

ELBOWS—Stove Pipe.

1-piece Corrugated. Uniform.	Doz.
5-inch	$1 45
6-inch	1 60
7-inch	2 10
Special Corrugated.	Doz.
6-inch	$1 45
7-inch	1 75

Uniform, Collar Adjustable.

	Doz.
5-inch	$2 00
6-inch	2 10
7-inch	2 60

WOOD FACES—50% off list.

FENCE.

Field Fence	60½
Lawn "	53%

FILES AND RASPS.

Heller's (American)	65-5%
American	65-5%
Arcade	60 & 10%
Black Diamond	50-5%
Eagle	60-10%
Great Western	60 & 10%
Kearney & Foot	60 & 10%
McClellan	60 & 10%
Nicholson	50-10%
Simonds	60%

FIRE POTS.

Ashton Mfg. Co.
Complete line Firepots and Torches...52%

Otto Bernz Co.

No. 1 Furn. Gasolene with large shield, 1 gal.	$ 6 75
No. B Furn. Kerosene, 1 gal.	15 12
No. 10 Brazier, Kerosene or Gasolene, 10 gals.	47 52
No. 5 Torch, Gasolene or Kerosene, 1 pt.	7 92
No. 83 Torch, Gasolene, 1 quart	5 40
No. 86 Torch, Gasolene, 1 pt.	4 05

Clayton & Lambert's.
East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Amarillo, San Angelo and Laredo, Texas 52%
West of above boundary line.48%

Geo. W. Diener Mfg. Co. Ea.

No. 02 Gasolene Torch, 1 qt.	$ 5 55
No. 0250, Kerosene or Gasolene Torch, 1 qt.	7 50
No. 10 Tinners' Furn. Square tank, 1 gal.	12 60
No. 15 Tinners' Furn. Round tank, 1 gal.	12 00
No. 21 Gas Soldering Furnace	3 60
No. 110 Automatic Gas Soldering Furnace	10 50

Double Blast Mfg. Co.
Gasolene, Nos. 25 and 35...60%

Quick Meal Stove Co.
Vesuvius, F.O.B. St. Louis 30% (Extra Disct. for large quantities)

Chas. A. Hones, Inc.

Buzzer No. 1	$ 9 00
" " 2	12 00
" " 22	13 50
" " 42	15 00
" " 43	19 00

FREEZERS—ICE CREAM.

Peerless and Alaska

1 quart	$2 95
2 quart	3 45
3 quart	4 10

White Mountain

½ quart	$3 50
1 quart	4 90
2 quart	5 70

GALVANIZED WARE.

Pails (Competition), 8-qt.	$2 20
10-qt.	2 50
12-qt.	2 75
14-qt.	3 00
Wash tubs, No. 1	7 25
No. 2	8 00
No. 3	9 25

GARAGE DOOR HARDWARE.
Stanley ....All net

GAUGES.
Marking, Mortise, etc.....Nets

Wire.
Disston's 25%

GIMLETS.
Discount ....65% and 10%

GLASS.
Single Strength, A and B, all sizes ....88 & 85%
Double Strength, A, all sizes 84%

GREASE, AXLE.

Frazers'

1-lb. tins, 36 to case, per case	$ 4 70
3-lb. tins, 24 to case, per case	7 80
5-lb. tins, 12 to case, per case	7 20
10-lb. tins, per dozen	10 40
15-lb. tins, per dozen	13 80
25-lb. tins, per dozen	19 80

HAMMERS, HANDLED.

All V. and B.	Each, net
Blacksmiths' Hand, No. 0, 26-oz.	$1 00
Engineers' No. 1, 26-oz.	1 00
Farrier's, No. 7, 7-oz.	93
Machinists', No. 1, 7-oz.	78
Nail.	
Vanadium, No. 41, 20-oz. each	1 45
Vanadium, No. 41½, 16-oz., each	1 45
V. & B., No. 11½, 16-oz. each	1 04
Garden City, No. 111½, 16-oz., each	87
Tinner's Riveting, No. 1, 8-oz., each	82
Shoe, Steel, No. 1, 18-oz., each	65
Tack.	
Magnetic. No. 5, 4-oz., each	72

HAMMERS, HEAVY.

Farrier's	20%
Mason's. Single and Double Face	50%

HANDLES.

Axe.	
Hickory, No. 1....per doz.	3 00
Hickory, No. 2.... "	4 00
1st quality, second growth	6 00
Special white, 2nd growth	4 50
Chisel.	
Hickory, Tanged, Firmer Assorted ....per doz.	55c
Hickory, Socket, Firmer, Assorted ....per doz.	70c
File....per doz.	$1 20
Hammer and Hatchet.	
No. 1 per doz.	$0 90
Second growth hickory, per doz.	1 40
Soldering.	
Per doz.	$2 40

HANGERS.

Conductor Pipe.	
Milcor Perfection Wire	25%
Eaves Trough.	
Steel hangers	30%
Triple Twist wire	10%
Milcor Eclipse Wire	20%
Milcor Triplex Wire	15%
Milcor Milwaukee Extension	15%
Milcor Steel (galv. after forming) List plus	12½ %
Milcor Selflock E. T. Wire, List plus	40%

HASPS.
Hinge, Wrought, with staples, Net

HATCHETS.

V. and B. Supersteel.	Each
Broad, No. 1, 24-oz.	$1 43
Half, No. 1, 16-oz.	1 25
Half, No. 3, 27-oz.	1 37
Claw, No. 1, 19-oz.	1 31
Flooring, No. 1, 30-oz.	1 43
Shingling, No. 1, 17-oz.	1 20
Lathing, No. 1, 14-oz.	1 20
Lathing, No. 2, 17-oz.	1 25
Vanadium Steel.	
Half, No. 62, 22-oz.	$1 82
Underhill Pattern Lathing, 9 row, 19-oz.	2 29

HINGES.

Heavy Strap, in Bundles.	
4 inch, dozen prs.	$1 12
5 " " "	1 57
6 " " "	1 93
8 " " "	3 95
Extra Heavy T in Bundles.	
4 inch, dozen prs.	$1 74
5 " " "	1 85
6 " " "	2 31
8 " " "	3 95

HOES.
Garden ....Net

HOOKS.

Box.	
V. and B. No. 9, each	$0 26
Conductor.	
Milcor	
"Direct Drive" Wrought Iron for wood or brick	15%
Cotton.	
V. and B. No. 8, each	24
Hay.	
V. and B. No. 1, each	26
Bar Meat.	
V. and B. No. 26, ⅝", each	09
V. and B. No. 28, ½", each	16
Screw Meat.	
V. and B. No. 2, per gro.	6 50
Butchers' "S."	
V. and B. No. 6, each	08
V. and B. No. 8, each	11

HOSE.

	Per. Ft.
¾-in. 2 ply molded	9½c to 13¾c
¾-in. cord	8½c to 10c
¾-in. wrapped	13½c

HUMIDIFIERS.

"Front-Rank," Automatic.	
In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

IRONS.

Sad.	
Genuine Mrs. Potts, nickel plated, per set	$1 55
Asbestos No. 70, per set.	2 10
Asbestos No. 100, per set.	2 30
E. C. Stearns'.	
No. OA Corner, doz. sets	$2 50
No. OB " " "	2 75

KNIVES.

Butcher.	
Beechwood Handles, 6-inch blade	25%
Beechwood Handles, 7-inch blade	25%
Beechwood Handles, 8-inch blade	25%
Cooper's Hoop.	25%
Drawing.	
Standard	25%
Adjustable	25%
Barton's Carpenters'	25%
Hay.	
Iwan's Solid Socket	25%
Heath's	25%
Iwan's Sickle Edge	25%
Iwan's Imp'd Serrated	25%
Hedge.	
Challenge	25%
Disston's No. 1	25%
Putty.	
Common	25%
Lander's	25%
Scraping.	
Beech Handles	25%
Lander's	25%

KNOBS.

Door.	
Mineral ....per doz.	$2 00
Porcelain .... "	2 00
Jet .... "	2 00

LADDERS.

Step.	
Common, per ft.	28c
Common, with Shelf, add 10c	
IXL	34c
Challenge, 6 to 9 ft.	55c
10 to 16 ft.	60c
Kant-Break, per lineal ft.	75c

LANTERNS.

	Per doz.
Monarch tin, hot blast	$ 8 25
Dietz No. 2, cold blast	13 00
Best tubular	8 25
Competition lanterns No. 0 tubular	6 90

LAWN MOWERS.

12-inch	$5 20
16-inch	5 85
Ball Bearing.	
4 blade, adjustable bearing.	
14"	$7 50
16"	7 80

LEATHER BELTING.

From No. 1 Oak Tanned Butts.	
Extra heavy, 18-oz.	35%
Heavy, 16-oz.	40%
Medium, 14½-oz.	40%
Light, 13-oz.	50%

LEATHER LACING.
Cut, strictly No. 1....45%

LEVELS.

Disston, No. 28 Asst.	$22 05
" No. 18, 20 in., each	1 83
" No. 22, 24 in., each	2 40
" Shafting, 6 in.	19 80
" " 6 in. gr. glass	24 20
" No. 1 Asst.	5 75
" No. 2 Asst.	12 40
" 24-26 in., each	1 02
" 28-30 in., each	1 00

LIFTERS.

Stove Cover.	
Coppered ....per gro.	$4 00
Alaska .... "	4 75

LOCKS.

Barn Door.	
No. 60 Stearn's..per doz.	$11 00
No. 80 " "	20 00

MALLETS.

Carpenters'.	
Fibre Head No. 2, per doz.	$12 00
" No. 3, "	15 50
" No. 3½, "	20 50
Round Hickory ....per doz.	$3 00— 5 00
Tinners'.	
Hickory ....per doz.	$2 25

MATS.

Door.	
National Rigid	5 & 10 & 5%
Acme Steel Flexible	60%

MITRES.

Galvanized steel mitres, and caps, end pieces, outlets	30%
Milcor	
Galv. one piece stamped	40%

MOPS.

Cotton, Star (Cut Ends).				
Pounds	12'	15'	18'	24'-3-oz.
Per doz.	$4 00	4 35	5 50	7 00
Enterprise				16¾%
Parker				50 & 5%

NAILS.

Cut Steel	$4 70
Cut Iron	4 70
Wire.	
Common	2 80
Cement Coated.	
Small Lots	2 30
Horseshoe.	
Ausable	55 & 5%
Capewell	15%
Perfect	55 & 5%
Putnam	20 & 5%
Star	30 & 5%

NETTING, POULTRY.

Galvanized before weaving	45-10%
Galvanized after weaving	45%

NIPPERS.

Nail Cutting.	
V. & B. No. 30	75c
Double Duty.	
V. & B. No. 60	75c
Hoof.	
Heller's	40 & 10%
V. & B. No. 52, each	$2 25

NOZZLES.

Hose.	
Magic ....per doz.	$9 50
Diamond .... "	5 75

OILERS.

Chase Pattern.	
Brass and Copper	10%
Zinc Plated	40 & 5%
Railroad.	
Brass	20 & 5%
Coppered	50 & 5%
Steel.	
Copper Plated	70 & 5%

OPENERS.

Delmonico ....per doz.	$1 30
Never Slip .... "	85
Crate.	
V. & B...per doz.	$7 25—11 00

PAILS.

Cream.	
14-qt. without gauge, ...per doz.	$9 50
18-qt. without gauge, ...per doz.	11 00
20-qt. without gauge, ...per doz.	11 75
Sap.	
10-qt., IC Tin....per doz.	$4 00
12- " " " "	5 50
Stock.	
Galv. qts. 14 16 18 20	
Per doz. $9 75 10 75 12 75 14 50	
Water.	
Galvanized qts. 10 12 14	
Per doz. $5 75 6 60 7 35	

PARERS.

Apple.

Goodell's	per doz.	$10 80
Turntable	"	11 40
White Mountain	"	8 40
Reading No. 78	"	11 40

PICKS.

Contractors' 40%
Railroad .....50 & 5%

PINCERS.

All V. & B.

Carpenters', cast steel, No.	6	8	10	12
Each	$0 43	$0 52	$0 61	$0 71

Blacksmiths', No. 10.....$0 64

PINS.

Clothes.
Common, per box of 5 gro. $0 95

PIPE.

Conductor.
"Interlock" Galvanized.
Crated and nested (all gauges) 60-7½%
Crated and not nested (all gauges) 60-2½%
Square Corrugated A and B and Octagon.
29 Gauge 60-10%
28 " 60-10%
26 " 60-10%
24 " 60-10%

"Interlock."
Crated and nested (all gauges) 60-7½%
Prices for Galvanized Toncan Metal, Genuine O. H. Iron, Lyonmore Metal and Keystone C. B. on application.

Stove. Per 100 joints.

26 gauge, 5 inch E. C. nested	$16 00
26 gauge, 6 inch E. C. nested	17 00
26 gauge, 7 inch E. C. nested	19 00
28 gauge, 5 inch E. C. nested	14 00
28 gauge, 6 inch E. C. nested	15 00
28 gauge, 7 inch E. C. nested	17 00
30 gauge, 5 inch E. C. nested	12 00
30 gauge, 6 inch E. C. nested	14 00
30 gauge, 7 inch E. C. nested	16 00
T-Joint Made up, 6-inch..... per 100	$40 00

Furnace Pipe.
Double Wall Pipe and Fittings 40%
Single Wall Pipe, Round Pipe Fittings 40%
Galvanized and Back Iron Pipe, Shoes, etc....40%
Milcor, galvanized.....40%

PLANES.

Stanley Iron Bench.....Net

PLIERS.

(V. & B.)

Nut, No. 3, each		$2 60
" No. 5, each		64
" No. 25, each		69
Gas, No. 7, each		55
" No. 8, each		61
" No. 12, each		87
Lining or Crimping. No. 35, each		64
Button's Pattern. No. 6 each		61
No. 8 each		74
Double Duty, No. 106		50

POINTS, GLAZIERS'.

No. 1, 2 and 3..per doz. pkgs. 65c

POKERS, STOVE.

Wr't Steel, str't or bent	per doz.	$0 75
Nickel Plated, coil handles	"	1 10

POKERS, FURNACE.

Each $0 50

PULLEYS.

Awning—Jap'd 10%
Clothes Line 10%

Hay Fork.

Iron Wheel, 5-in.	per doz.	$2 50
Wood Wheel, 6-in.	"	2 65
Wood Wheel, 6-in. pass knot	"	3 00

Sash.
Common .....Net
Common-Sense, 2-in.....Net
Empire Pattern, 2-in.....Net
Ideal .....Net
Steel .....Net

Furnace Regulator, doz. lots, per doz. $0 60

PUNCHES.

Machine.	Each.
V. & B., No. 11-13, 1½x6	$0 19
V. & B., No. 90, ⅝x9	27
V. & B., No. 10, ⅝x10	29
V. & B., No. 1-6, ½x6	12

Center.
V. & B., No. 50, ⅝x4.....$0 14

Belt.

V. & B., No. 101-103	$0 24
V. & B., No. 108-109	32
V. & B., No. 25, ass't	3 80

Samson Line.
No. 1 Hand { Doz. lots or less 40%
No. 2 Hand { 3 doz. lots ...Less 40 & 5%
No. 4 Hand { 6 doz. lots or more...Less 50%
No. 3 Bench { Less than doz. lots...Less 25% / Doz. lots or more...Less 40%

Extra Punches and Dies for Samson:
No. 1 Hand { Less than doz. lots....Less 25%
No. 2 Hand { Doz. lots, ...Less 33⅓%
No. 4 Hand { 3 doz. lots, ...Less 40%
No. 3 Bench { 6 doz. lots or more. ..Less 40 & 10%

PUTTY.

Commercial Putty, 100-lb. kits $3 55

QUADRANTS.

Malleable Iron Damper.....10%

RAZORS—SAFETY.

Gillette	per doz.	$45 00
Auto Strop	"	45 00
Gem	"	3 40
Gem (3 doz. lots)	"	3 00
Every Ready	"	3 40
Ever Ready (3 dz. lots)	"	3 00

RAZORS STRAIGHT.

RAZOR STROPS.

Star (Honing) 50%

FLOOR REGISTERS AND BORDERS.

Cast Iron 20%
Steel and Semi-Steel.....33⅓%
Baseboard 33⅓%
Adjustable Ceiling Ventilators 33⅓%

Register Faces—Cast and Steel
Japanned, Bronsed and Plated.
4x6 to 14x14.....33⅓%
Large Register Faces—Cast, 14x14 to 38x42.....60%
Large Register Faces—Steel, 14x14 to 38x42.....65%

PAPER.

Roofing.	Per Square.
Best grade, slate surf. prepd.	$2 00
Best talc surfaced	2 25
Medium talc surfaced	1 60
Light talc surfaced	0 95
Red Rosin Sheathing, per ton	75 00

ROPE.

Cotton.
¼, 5-16 in. and larger, per lb.....50c to 60c
Sisal.
1st Quality, base 14½c to 16½c
No. 2 .....13½c to 15c
Manila.
1st Quality standard brands .....18½c to 20½c
No. 2 .....17c to 18½
Hardware Grade, per lb. 17½c

SAWS.

Butchers'.

Atkins	No. 2, 14-in.	$12 75
"	No. 2, 18-in.	14 20
"	No. 7, 16-in.	15 85
"	No. 2, 22-in.	15 92
"	No. 7, 20-in.	18 05
"	No. 7, 24-in.	20 20
"	No. 7, 28-in.	22 35

Compass.

Atkins	No. 2, 10-in.	$ 5 45
"	No. 10, 10-in.	5 60
"	Blades, No. 2, 10-in.	3 25
"	" No. 2, 10-in.	3 30

Cross-Cut.

Atkins	No. 221, 4 ft.	$3 03
"	No. 221, 6-ft.	4 45
"	No. 221, 8-ft.	6 07

Hand.
Copper Burrs only.....30%
" No. 96, 26-in..... 21 70

Hand and Rip.

Atkins	No. 54, 20-in.	$19 50
"	No. 54, 26-in.	24 40
"	No. 53, 16-in.	18 10
"	No. 53, 20-in.	22 90
"	No. 53, 24-in.	26 60
"	No. 53, 28-in.	31 45
"	No. 53, 30-in.	34 15

Keyhole.

Atkins	No. 1, complete	$3 10
"	No. 2, complete	3 70

Miter Box.

Atkins	No. 1, 4x20	$32 65
"	No. 1, 5x22	38 00
"	No. 1, 6x22	42 20

Pruning.

Atkins	No. 20, 12-in.	$ 3 45
"	No. 10, 16-in.	18 15

Wood.

Atkins	No. 202	$ 7 19
"	No. 318	8 75
"	No. 906	15 50
"	No. 1509	16 56

SCRAPERS.

Box.
No. 6, six blades each.... 25c
Hog.
No. 6, each..... 25c
Floor (Stearns).
No. 10, each.....$11 50

SCREEN DOOR HINGES.

Cast Iron	gross	$13 00
Steel	"	9 50

SCREWS.

Jack.....Standard List 45%
gimlet pointed.....50-5%
gimlet pointed.....40-10%
Wood.
F. H. Bright 80%
R. H. Blued 78%
F. H. Jap'd 74%
F. H. Brass 76%
R. H. Brass 74%
Sheet Metal.
No. 7, ½x ½, per gross.$0 55
No. 10, ⅝x3/16, per gross. 75
No. 14, ⅞x ¼, per gross. 90

SCREW DRIVERS.

Uncle Sam Standard Head.

3 inches, each	$ 45
5 inches, each	52
8 inches, each	68
12 inches, each	1 02

Uncle Sam Insulated Head.

3 inches, each	$ 49
5 inches, each	57
8 inches, each	76
12 inches, each	1 14

SETS.

Nail.
V. & B.
No. 100, in cardboard boxes .....doz. $1 55
No. 100, in wooden boxes, ... doz. 1 55
No. 30, assorted.....doz. 39
No. 5, in cardboard boxes, ... doz. 1 25
No. 5, in wooden boxes, ... doz. 1 30
Rivet.
V. & B.
Farmers' $0 13
Tinners' 3-4 ..... 0 40
" 00-0..... 0 60
Saw.
Atkins No. 10....per doz. $3 80
" No. 12.... " 6 20

SHEARS.

		Per Doz.
Nickel Plated, Straight,	6"	$12 90
" " "	7"	14 85
" " "	8"	16 80
Japanned, Straight	6"	11 00
" "	7"	12 40
" "	8"	13 80

SHEARS, TINNERS' & MACHINISTS'.

Viking $22 00
Lennox Throatless.
No. 18 .....35%
Shear blades.....10%
(f.o.b. Marshalltown, Iowa.)
Peerless Steel Squaring.
Foot Power.
No. 1—30", 18 ga. cap.....15%
No. 2—36", 18 ga. cap.....15%
No. 4—52", 18 ga. cap.....15%
No. 10—120", 22 ga. cap....15%
No. 4A—52", 16 ga. cap....15%
Cast Iron Foot Power.
No. 01, 30", 18 ga. cap....15%
Power Driven.
(No. 100 Series, 2 Shaft Drive.)
No. 142—42", 18 ga. cap....15%
(No. 200 Series, 2 Shaft Underneath Drive.)
No. 242—42", 14 ga. cap...15%
(No. 300 Series, 3 Shaft Underneath Drive.)
No. 342—42", 10 ga. cap....15%
No. 372—72", 10 ga. cap....15%
(No. 500 Series, 3 Shaft Underneath Drive.
No. 596—96", 10 ga. cap...15%
(No. 600 Series, 3 Shaft Underneath Drive.)
No. 6120—120", 3/16" cap..15%

SHEAVES, SLIDING DOOR.

Common. Inches	3	4	5
Per set	$1 40	1 75	2 40

Hatfield's.
Per set $1 80 2 10 2 75 35

SHINGLES.

Per Square
Zinc (Illinois) $18 00

SHOES.

Milcor.
Galv. Std. Gauge, Plain or corg. round flat crimp...60%
26 gauge round flat crimp..40%
24 gauge round flat crimp..10%
Conductor 60%

SHOVELS AND SPADES.

Coal.
Hubbard's.

No.	A	B	C	D
1	$16 00	15 10	14 45	13 70
2	16 35	15 60	14 85	14 10
3	16 75	16 00	16 25	14 45
4	17 10	16 35	16 60	14 85

Post Drains & Ditching.
Hubbard's.

Size	A	B	C
14"	$17 15	$16 40	$15 65
16"	17 50	16 75	16 00
18"	17 85	17 10	16 35
20"	18 20	17 45	16 70
22"	18 55	17 80	17 05

Alaska Steel.
D-Handle .....per doz. $3 50
Long Handle ..... " 3 00

SIFTERS.

Genuine Hunters, doz.....$2 50

SKATES.

Roller.
Ball Bearing—Boys' $1 65
Ball Bearing—Girls' 1 75

SNATHS.

Double Ring Bush..per doz.		$9 75
Patent Loop, Grass	"	8 75
Patent Loop, Bush.	"	10 00

SNIPS, TINNERS'.

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES.

Steel and Iron.....Net
(Add for bluing, $3.00 per doz. net)
Mitre ..... "
Try ..... "
Try and Bevel..... "
Try and Mitre..... "
Fox's .....per doz. $6 00
Winterbottom's 10%

STAPLES.

Blind.
Barbed .....per lb. 21@22c
Butter, Tub..... " 16@19c
Fence—
Polished .....per 100 lbs. $5 45
Galvanized ... " 6 15
Netting.
Galvanized ...per 100 lbs. $6 54
Wrought.
Wrought Staples, Hasps and Staples, Hasps, Hooks and Staples, and Hooks and Staples .....50 & 10%
Extra heavy 35%

STONES.

Axe.
Hindostan .... per lb. New Nets
More Grite .... " "
Washita ..... " "
Emery.
No. 126.....per doz. New Nets
Oil—Mounted.
Arkansas Hard No. 7.....per doz. New Nets
Arkansas Soft. " "
Washita No. 717 " "
Oil—Unmounted.
Arkansas Hard per lb. New Nets
Arkansas Soft. " "
Lily White.... " "
Queer Creek... " "
Washita ..... " "
Scythe.
Black Diamond per gro. New Nets
Crescent ..... " "
Green Mountain " "
LaMolle ..... " "
Extra Quinnebog ..... " "
Red End ..... " "

STOPS, BENCH.

No. 10 Morrill pattern .....per doz. $11 00
No. 11 Stearns pattern ..... " 10 00
No. 15 Smith pattern ..... " 7 00

STOPPERS, FLUE.

Common .....per doz. $1 10
Gem, No. 1..... " 1 10
Gem, flat, No. 3... " 1 00

STRETCHERS.

Carpet.
Bullard's .....per doz. $3 90
Excelsior ..... " 5 25
Malleable Iron.... " 70
Perfection ..... " 6 30
King ..... " 4 50
Wire.
O. S. Elwood, No. 1 per doz. Nets
O. S. Elwood, No. 2, " "

SWIVELS.

Malleable Iron.....per lb. $0 10
Wrought Steel.....per gro. 4 50

TACKS.

Bill Posters' 6-oz. 25-lb. boxes per lb. 15c
Upholsterers' 6-oz., 25-lb. boxes, per lb.....15½c

TAPES, MEASURING.

Asses' Skin .....List & 40%

THERMOMETERS

Tin Case...per doz. 80c & $ 1 25
Wood Backs " $2 00 & 12 00
Glass ..... " 12 00

TIES.

Bale.
Single Loop, carload lots .....75 & 7%
Single Loop, less than car lots .....70 & 15%

TRAPS.

Mouse and Rat.	Per Gross.
Sure Catch Mouse Traps.	$ 2 10
Vim Mouse Traps.....	2 10
Short Stop Mouse Traps.	1 80
Wood Choker Mouse Traps, 4 hole.....	10 25
	Per Doz.
Sure Catch Rat Traps....	$0 90
Dead Easy Rat Traps....	1 00

Baskets.
Packed in One Bushel Band Stave
List per Bushel.

Sure Catch Mouse Traps (360 Traps)	$ 5 25
Short Stop Mouse Traps (360 Traps.).....	4 50
Sure Catch Rat Traps (54 Traps)	3 60
Short Stop Rat Traps (54 Traps)	3 15

Assorted Mouse and Rat Traps.
List per Bushel.

Sure Catch (216 Mouse Traps and 26 Rat Traps)	$4 90
Short Stop (216 Mouse Traps and 26 Rat Traps)	4 25

TROWELS.

Cement.
Atkins No. 6.....$19 50
" No. 9..... 25 50

TWINE.

White Cotton.
Eureka, 4-ply.....per lb. 30c
Jute.
3-ply and 6-ply Bale Lots 22½c

VALLEY.

Milcor .....
Galv. formed or roll.....50-7½%

VENTILATORS.

Standard.....30 to 40%

VISES.

No. 700 Hand, Inches	4½	5	5½
Doz.	$11 15	13 00	14 85
No. 701. In.	4	5	6
Doz.	$11 15	13 00	16 70

No. 1, Genuine Wentworth, Noiseless Saw...per doz. 9 25
No. 3, Genuine Wentworth, Noiseless Saw....per doz. 12 75
No. 500, All Steel Folding Saw .....per doz. 16 00

WASHERS.

Over ½ in. barrel lots per 100 lbs.....$6 25
Iron and Steel.

In.	5/16	⅜	½	⅝	¾
	10¼c	9¼c	7¾c	7½c	7 2/5c

WEATHER STRIPS.

Metallic Stitched.
½ in., per 100 ft.....$1 80
¾ in., per 100 ft..... 2 20
Wood and Felt.
⅝ in., per 100 ft.....$1 56
⅞ in., per 100 ft..... 1 56

WEIGHTS.

Hitching .....per lb. Nets
Sash—f. o. b. Chicago
Smaller lots, per ton.....$50 00

WHEEL BARROWS.

Common Wood Tray.....$3 00
Steel Tray, Competition.... 4 50
Steel leg, garden..... 5 00

WIRE.

Plain annealed wire, No. 8 per 100 lbs.....$3 70
Galvanized barb wire, per 100 lbs. 4 10
Wire cloth—black painted, 12-mesh, per 100 sq. ft... 2 35
Cattle Wire—galvanized catch weight spool, per 100 lbs. 4 60
Galvanized Hog Wire, 80 rod spool, per spool..... 3 95
Galvanized plain wire, No. 9, per 100 lbs..... 4 15

WOOD FACES.

50% off list.

WRENCHES.

Coes Steel Handle,		6-in.	40-10%
" " "		8-in.	40-10%
" " "		10-in.	40-10%
" " "		12-in.	40-10%
Coes Knife-Handle,		6-in.	40-10%
" " "		8-in.	40-10%
" " "		10-in.	40-10%
" " "		12-in.	40-10%

Coes All Patterns.....40-10%

WRINGERS.

No. 790, Guarantee	per doz.	$49 50
No. 770, Bicycle ...	"	47 00
No. 670, Domestic..	"	43 50
No. 110, Brighton...	"	39 00
No. 750, Guarantee..	"	51 00
No. 740, Bicycle....	"	48 50
No. 22, Pioneer....	"	35 50
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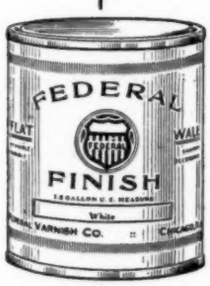


White Enamels That Possess Lasting Qualities

WHEN it comes to selling your customers White Enamel you have to choose your lines carefully if you are to give the satisfaction demanded. It is common for White Enamels to turn **yellow, to crack** and to **lose luster.**

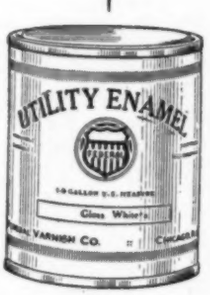
Federalite and Federal White Enamels and Flat White Finishes are all made to meet individual and exact requirements.

With the Federal complete line in stock you can serve your trade with their particular needs—make good profits and give satisfaction.

The reason why Federal Enamels possess lasting qualities is that we pay particular attention to small but important details in making Federal Enamels as well as using only high quality ingredients.

Federalite Coaters and Oil Stains also have special service features that make them superior products.

Let us send you descriptive catalog giving full details—also our dealer helps and prices.



Federal Varnish Company

2837-55 Irving Park Blvd. CHICAGO, ILLINOIS

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Kruse Co., Indianapolis, Ind.
Lamneck Co., W. E., Columbus, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Majestic Co., Huntington, Ind.
Meyer Furnace Co., Peoria, Ill.
Michigan Stove Co., The Detroit, Mich.
Monroe Fdy. & Furnace Co., Monroe, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Quick Furnace & Supply Co., Des Moines, Iowa
Red Front Furnace & Supply Co., Chicago, Ill.
Roesch Enamel Range Co., Belleville, Ill.
Scheible-Moncrief Heater Co., Cleveland, Ohio
Schwab & Sons Co., R. J., Milwaukee, Wis.
Standard Furnace & Supply Co., Omaha, Nebraska
St. Clair Foundry Corporation, Belleville, Ill.
Success Heater & Mfg. Co., Des Moines, Iowa
Thatcher Furnace Co., Chicago, Ill.
Utica Heater Co., Utica, N. Y.
Waterman-Waterbury Co., Minneapolis, Minn.
Wise Furnace Co., Akron, Ohio

Garages—Metal.
Milwaukee Corrugating Co., Milwaukee, Wis.

Guards—Fire.
Meyers Mfg. Co., Fred J., Hamilton, Ohio

Handles—Boiler.
Berger Bros. Co., Philadelphia, Pa.

Hangers—Eaves Trough.
Milwaukee Corrugating Co., Milwaukee, Wis.

Heaters—Combination Hot Water.
Melbye Bros. Co., Chicago, Ill.

Heaters—School Room.
Haynes-Langenberg Mfg. Co., St. Louis, Mo.
Hero Furnace Co., Sycamore, Ill.
Meyer Furnace Co., Peoria, Ill.
Monroe Fdy. & Furnace Co., Monroe, Mich.
Standard Furnace & Supply Co., Omaha, Neb.

Horse Shoes.
American Steel & Wire Co., Chicago, Ill.

Hotels.
Spaulding Hotel, Michigan City, Ind.

Jobbers—Hardware
Bullard & Gormley Co., Chicago, Ill.
Clark-Smith Hardware Co., Peoria, Ill.

Kitchen Utensils.
Lalance & Grosjean Mfg. Co., Chicago, Ill.

Ladders.
Kant-Break Ladder Co., Inc., St. Louis, Mo

Lath—Expanded Metal.
Milwaukee Corrugating Co., Milwaukee, Wis.

Machines—Crimping
Bertsch & Co., Cambridge City, Ind.

Machinery—Culvert.
Bertsch & Co., Cambridge City, Ind.

Machines—Razor Blades
Hyfield Mfg. Co., New York, N. Y.

Machines—Stove Pipe
Hemp & Co., St. Louis, Mo.

Machines—Tinsmiths'
Bertsch & Co., Cambridge City, Ind.
Chicago Elbow Machine Co., Oak Park, Ill.
Dreis & Krump Mfg. Co., Chicago, Ill.
Ewert & Kutscheid Mfg. Co., Chicago, Ill.
Hemp & Co., St. Louis, Mo.
Maplewood Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Mailing Lists.
Ross-Gould, St. Louis, Mo.

Metals—Perforated.
Harrington & King Perforating Co. Chicago, Ill.

Miters.
Friedley-Voshardt Co., Chicago, Ill.

Miters—Eaves Trough.
Braden Mfg. Co., Terre Haute, Ind.
Milwaukee Corrugating Co., Milwaukee, Wis.

Nails—Slating.
Hussey & Co., C. G., Pittsburgh, Pa.

Nails—Wire.
American Steel & Wire Co., Chicago, Ill.

Ornaments—Sheet Metal.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.
Milwaukee Corrugating Co., Milwaukee, Wis.

Patterns—Furnace & Stove.
Cleveland Castings Pattern Co., Cleveland, Ohio
Quincy Pattern Co., Quincy, Ill.
Vedder Pattern Works, Troy, N. Y.

Pipe and Fittings—Furnace.
Dunning Heating & Supply Co., Milwaukee, Wis.
Excelsior Steel Furnace Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lamneck Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Quick Furnace & Supply Co., Des Moines, Iowa
Red Front Furnace & Supply Co., Chicago, Ill.
Standard Furnace & Supply Co., Omaha, Neb.

Pipe and Fittings—Stove.
Excelsior Steel Furnace Co., Chicago, Ill.
Hemp & Co., St. Louis, Mo.
Meyer & Bro. Co., F., Peoria, Ill.
Sullivan-Geiger Co., Indianapolis, Ind.

Pipe—Conductor.
Berger Bros. Co., Philadelphia, Pa.
Burton Co., W. J., Detroit, Mich.
Clark-Smith Hdw. Co., Peoria, Ill.
Dieckmann Co., Ferdinand, Cincinnati, Ohio
Friedley-Voshardt Co., Chicago, Ill.
Hussey & Co., C. G., Pittsburgh, Pa.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
New Jersey Zinc Co., The, New York, N. Y.

Posts—Steel Fence.
American Steel & Wire Co., Chicago, Ill.

Punches.
Bertsch & Co., Cambridge City, Ind.
Machine Appliance Corporation, The, Brooklyn, New York
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Punches—Combination Bench and Hand.
Whitney Metal Tool Co., Rockford, Ill.

Punches—Hand.
Machine Appliance Corporation, The, Brooklyn, New York
Whitney Metal Tool Co., Rockford, Ill.

Ranges—Combination Gas & Coal.
American Stove Co., St. Louis, Mo.
Malleable Iron Range Co., Beaver Dam, Wis.
Quick Meal Stove Co., St. Louis, Mo
Roesch Enamel Range Co., Belleville, Ill.

GARDEN TOOLS, GENERAL AND BUILDERS' HARDWARE, MECHANICS' TOOLS, CUTLERY, GUNS, AMMUNITION, SPORTING GOODS AND FISHING TACKLE.

Ranges—Gas.
American Stove Co., St. Louis, Mo.
Clark & Co., Geo. M., Chicago, Ill.
Dangler Stove Co., Cleveland, O.
Quick Meal Stove Co., St. Louis, Mo.
Roesch Enamel Range Co., Belleville, Ill.

Rasps.
Heller Bros., Newark, N. J.

Register Chain.
American Chain Co., Bridgeport, Conn.

Register Shields.
Hall-Neal Furnace Co., Indianapolis, Ind.

Register—Warm Air.
Dunning Heating Supply Co., Milwaukee, Wis.
Excelsior Steel Furnace Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Majestic Co., Huntington, Ind.
Quick Furnace & Supply Co., Des Moines, Iowa
Red Front Furnace & Supply Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Standard Furnace & Supply Co., Omaha, Neb.
Stearns Register Co., Detroit, Mich.
Tuttle & Bailey Mfg. Co., Chicago, Ill.
Walworth Run Fdy. Co., Cleveland, Ohio
Waterloo Register Co., Waterloo, Iowa

Registers—Wood.
American Wood Register Co., Plymouth, Wis.

Regulators—Heat.
Honeywell Heating Specialties Co., Wabash, Ind.

Repairs—Stove & Furnace.
Hessler Co., H. E., Syracuse, N. Y.

Retinning Equipment.
Callender Soldering Process Co., Chicago, Ill.

Ridging.
American Rolling Mill Co., Middletown, Ohio
Milwaukee Corrugating Co., Milwaukee, Wis.

Rivets—Stove.
Kirk-Latty Mfg. Co., Cleveland, Ohio

Roasters.
Lalance & Grosjean Mfg. Co., Chicago, Ill.

Rods—Stove.
Kirk-Latty Mfg. Co., Cleveland, Ohio

Rolls—Forming.
Bertsch & Co., Cambridge City, Ind.

Roof—Flashing.
Hessler Co., H. E., Syracuse, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Roofing—Iron and Steel.
American Rolling Mill Co., Middletown, Ohio
Burton Co., W. J., Detroit, Mich.
Cortright Metal Roofing Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Roofing—Tin.
Taylor Co., N. & G., Philadelphia, Pa.

Roofing—Zinc.
Illinois Zinc Co., New York, N. Y.
New Jersey Zinc Co., The, New York, N. Y.

Rubbish Burners.
Hart & Cooley Co., New Britian, Conn.

Schools—Automobile Radiator Repairing.
Zideck Auto Radiator School, New York, N. Y.

Schools—Sheet Metal Trades.
Zideck School of Sheet Metal Trades, New York, N. Y.

Schools—Sheet Metal Pattern Drafting.
St. Louis Technical Institute, St. Louis, Mo.
Zideck Auto Radiator School, New York, N. Y.

Screens—Perforated Metal
Harrington & King Perforating Co., Chicago, Ill.

Shears—Hand and Power.
Ewert & Kutscheid Mfg. Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Viking Shear Co., Erie, Pa.

Sheets—Black and Galvanized.
American Rolling Mill Co., Middletown, Ohio
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Iron.
American Rolling Mill Co., Middletown, Ohio
Merchant & Evans Co., Philadelphia, Pa.

Sheets—Tin.
Merchant & Evans Co., Philadelphia, Pa.
Taylor Co., N. & G., Philadelphia, Pa.

Shingles—Zinc.
Illinois Zinc Co., New York, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Sifters—Ash.
Diener Mfg. Co., G. W. Chicago, Ill.

Sifters—Flour.
Meyers Mfg. Co., Fred J., Hamilton, Ohio

Sky Lights.
Burton Co., W. J., Detroit, Mich.
Milwaukee Corrugating Co., Milwaukee, Wis.

Smoke Pipe—Cast Iron.
Waterloo Register Co., Waterloo, Iowa

Solder.
Chicago Solder Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
Taylor Co., N. & G., Philadelphia, Pa.

Soldering Furnaces.
Ashton Mfg. Co., Newark, N. J.
Bernz Co., Otto, Newark, N. J.
Burgess Soldering Furnace Co., Columbus, Ohio
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., G. W., Chicago, Ill.
Double Blast Mfg. Co., North Chicago, Ill.
Hones, Inc., Chas. A., Baldwin, Long Island, N. Y.
Quick Meal Stove Co., St. Louis, Mo.

Specialties—Hardware.
Bullard & Gormley, Chicago, Ill.
Diener Mfg. Co., G. W., Chicago, Ill.
Heller Bros. Co., Newark, N. J.
Hessler Co., H. E., Syracuse, N. Y.
Hyfield Mfg. Co., New York, N. Y.
Lovell Mfg. Co., Erie, Pa.

Sporting Goods.
Bullard & Gormley, Chicago, Ill.

Stains—Oil and Acid.
Federal Varnish Co., Chicago, Ill.

Stars—Hard Iron Cleaning.
Fanner Mfg. Co., Cleveland, Ohio

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.

Stoves—Camp.
Quick Meal Stove Co., St. Louis, Mo.

Stoves—Gas.
Clark & Co., Geo. M., Chicago, Ill.
Dangler Stove Co., Cleveland, Ohio
Indiana Stove Works, Evansville, Ind.
National Stove Co., Lorain, Ohio
New Process Stove Co., Cleveland, Ohio
Quick Meal Stove Co., St. Louis, Mo.
Reliable Stove Co., Cleveland, Ohio

Stoves—Gasoline and Oil.
American Stove Co., St. Louis, Mo.
Clark & Co., Geo. M., Chicago, Ill.
Dangler Stove Co., Cleveland, O.
New Process Stove Co., Cleveland, Ohio
Quick Meal Stove Co., St. Louis, Mo.

Stoves and Ranges.
American Stove Co., St. Louis, Mo.
Copper Clad Malleable Range Co., St. Louis, Mo.
Gohman Bros. & Kahler, New Albany, Ind.
Indiana Stove Works, Evansville, Ind.
Malleable Iron Range Co., Beaver Dam, Wis.
Michigan Stove Co., The, Detroit, Mich.
National Stove Co., Lorain, Ohio
Quick Meal Stove Co., St. Louis, Mo.
Roesch Enamel Range Co., Belleville, Ill.

Stove Pipe Reducer.
Sullivan-Geiger Co., Indianapolis, Ind.

Tacks, Staples, Spikes.
American Steel & Wire Co., Chicago, Ill.

Temperature Regulators.
Honeywell Heating Specialties Co., Wabash, Ind.

Tiles and Shingles—Metal.
Burton Co., W. J., Detroit, Mich.
Cortright Metal Roofing Co., Philadelphia, Pa.
Illinois Zinc Co., New York, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Tinplate.
Milwaukee Corrugating Co., Milwaukee, Wis.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tin—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Tools—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Chicago Elbow Machine Co., Oak Park, Ill.
Dreis & Krump Mfg. Co., Chicago, Ill.
Ewert & Kutscheid Mfg. Co., Chicago, Ill.
Machine Appliance Corporation, The, Brooklyn, New York
Maplewood Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Vaughan & Bushnell Mfg. Co., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Torches.
Ashton Mfg. Co., Newark, N. J.
Bernz Co., Otto, Newark, N. J.
Burgess Soldering Furnace Co., Columbus, Ohio
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., G. W., Chicago, Ill.
Double Blast Mfg. Co., North Chicago, Ill.
Hones, Inc., Chas. A., Baldwin, Long Island, N. Y.
Quick Meal Stove Co., St. Louis, Mo.

Transit Companies.
Cleveland & Buffalo Transit Co., Cleveland, Ohio

Trimmings—Stove.
Fanner Mfg. Co., Cleveland, Ohio

Varnishes.
Cornish & Co., J. B., Chicago, Ill.
Federal Varnish Co., Chicago, Ill.

Ventilators.
Aeolus Dickinson Co., Chicago, Ill.
Arex Company, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.
Standard Ventilator Co., Lewisburg, Pa.

Ventilators—Ceiling.
Hart & Cooley Co., New Britian, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York

Water Heaters—Oil Burning.
Dangler Stove Co., Cleveland, O.

Wire.
American Steel & Wire Co., Chicago, Ill.

Wrenches.
Coes Wrench Co., Worcester, Mass

Wringers—Clothes.
Lovell Mfg. Co., Erie, Pa.

Zinc.
Illinois Zinc Co., New York, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Zinc Co., The, New York, N. Y.

Zinc—Slab.
Illinois Zinc Co., New York, N. Y.